Chapter 4 Environmental Consequences

In this Chapter:

- **Specific impacts from alternatives**
- **Recommended mitigation**
- **Cumulative impacts**

For Your Information

Review Chapter 2 for a full description of the alternatives.

Impacts from the Single-Circuit Line Alternative would be the same as the Agency Proposed Action with some exceptions.

Impacts from the Short Line Alternative would be the same as the Single-Circuit Line Alternative from Targhee Tap to Teton Substation.

See Map 1 to review locations.

***Mitigation** describes measures to lessen the impacts predicted for each resource. Measures may include reducing or minimizing the impact, avoiding it completely, or rectifying or compensating for the impact.*

***Cumulative impacts** are created by the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions.*

This chapter discusses the potential environmental impacts of the Agency Proposed Action, the Single-Circuit Line Alternative, the Short Line Alternative, the SVC Alternative, and the No Action Alternative.

To analyze potential impacts from construction, operation and maintenance activities, resource specialists analyzed actions using a scale with four impact levels: high, moderate, low and no impacts. Definitions of the impact levels vary with each resource and are given in the first part of each resource discussion.

Specialists considered direct, and indirect impacts in the short and long term. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. The impact discussion lists recommended mitigation that could reduce impacts and ***cumulative impacts*** of the alternatives.

The level of detail in the impact discussion for each affected resource depends on the character of that resource, and the significance of the issue. Additional detail for some resources can be found in appendices.

Construction of the Agency Proposed Action, Single-Circuit Line Alternative and the Short Line Alternative would be typical of other BPA transmission line projects (see Appendix F, **Construction Actions** for detail). Construction steps are in the box below.

Construction Steps

Typical transmission line construction steps include:

- improve or construct access roads,
- clear ROW (widen the existing ROW by about 23 m [75 feet]),
- prepare structure sites,
- excavate and install structure footings,
- deliver structures to the sites (steel, wood poles, insulators, conductors, and other miscellaneous equipment),
- assemble and erect structures,
- string and tension conductor (wire),
- install counterpoise (grounding wire), and
- restore and clean up sites.

For Your Information

Construction, operation and maintenance of transmission line and substation facilities can create temporary and permanent impacts on land use. Land uses within rights-of-way are limited to uses that do not interfere with the safe operation and maintenance of a transmission line. For instance, no buildings or other structures may be built on the ROW, and no flammable materials may be stored there.

*In addition, BPA discourages new uses of its rights-of-way that may increase public exposure to electric and magnetic fields, such as parks and parking lots. Future development of lands next to rights-of-way could also be affected by actual or perceived effects of a transmission line (see Section 4.11, **Socioeconomics**).*

4.1 Land Use

4.1.1 Impact Levels

Impacts would be considered **high** where transmission facilities would:

- preclude the primary existing or planned use of the land, and the area affected is greater than 5 percent of the available land designated for that use county-wide.
- create large areas of nonfarmable farmland (as defined in the Farmland Protection Policy Act (***FPPA***)(7 U.S.C. 4201 *et seq*.) by interference with land patterns and/or prevent or restrict existing farmland operations such as irrigation.

Impacts would be considered **moderate** where transmission facilities would:

- preclude the primary or planned use of the land, and the area affected is between 2-5 percent of the available land designated for that use county-wide.
- adversely affect existing farm operations and/or farmlands as defined in FPPA by construction such that previously unaffected productive land is lost around structures, and/or farm operations are affected by additional inconvenience to operations.

Impacts would be considered **low** where transmission facilities would:

- preclude the primary existing or planned land use of the land, and the area affected is less than 2 percent of the available land designated for that use county-wide, or where the transmission line would pose very minor or temporary impacts.
- create short-term disturbances such as minor crop damage during construction or restrict impacts to previously affected areas (e.g., existing structure locations).

No impact would occur to farmlands if no farmland as defined in the FPPA exists or no agricultural operations would be affected.

4.1.2 Agency Proposed Action

Reminder

Map 2 shows structure numbers and locations. Map 3 shows land use.

4.1.2.1 Impacts

Agriculture — From Swan Valley Substation to structure 4/5 at the base of the Big Hole Mountains, the line crosses Pine Creek Bench, an area of dryland farms that produce primarily wheat and barley. Impacts would be localized. About 0.04-0.12 hectares (0.1-0.3 acre) of wheat and barley would be removed from production for the life of the line from permanent placement of structures. Heavy machinery would damage crops and compact soils, causing a temporary loss of soil productivity. Impacts would be low to moderate.

From structures 4/7 through 5/2 the existing line crosses land used for hay production and pasture. Permanently placing three or four structures would cause the permanent loss of 60-80 m^2 (700-900 ft^2) of productive farmland. Impacts would be low to moderate and long term, with some short-term impacts from construction-related damage to soils and crops.

West of Teton Substation, the proposed transmission line crosses about 1.6 km (1 mile) of land used for pasture. West of Fish Creek, between structures 35/2 to 35/5, horses and cattle graze in a grass and sagebrush pasture. Between Fish Creek and Teton Substation (structures 35/7 to 36/4) the proposed line would cross flood-irrigated pasture. Impacts would be low and short term and include grazing interruptions and soil compaction. There would be no long-term impacts since the new double-circuit structures would occupy about the same amount of land as the existing wood pole structures.

Underground Line Termination Option at Teton Substation - There would be no impact to agricultural lands or existing agricultural operations from this option.

Timber and Range — In the worst case, new ROW would remove about 73 hectares (181 acres) of timberlands. On the Targhee, removal of this amount would not cause an impact because these lands are not part of amount available for harvest. On the Bridger-Teton, the amount harvested would be less than 1 percent of the available supply of timber, causing impacts to be low. Rangelands are scattered throughout the existing ROW and would not be impacted by adding new ROW.

Pine Creek Routing Options A-C — Impacts for these options are included in the discussion above.

Residential and Commercial — Teton Substation and adjacent lands to the north, east and south are zoned "NC-SF" (Neighborhood Conservation-Single Family). Since all new line termination equipment (for an overhead line approach or the

Underground Line Termination Option) would be placed within the existing property boundary, no zoning changes would occur. BPA would strive to meet the development regulations within this zoning district. Section 2390 of the Teton County Development Regulations requires that all utilities be located and designed to minimize negative impacts on natural, scenic, agricultural and residential objectives. A landscaping plan is required to screen the utility, except for utility lines, from roads and houses. Utility buildings that house utility equipment should be designed with as low a profile as possible and the building style should be compatible with the surrounding land uses, if the surrounding land uses are residential.

At Teton Substation, BPA and surrounding neighbors are putting in landscaping that helps screen new substation equipment added in 1993-94. The landscaping would also help screen any new equipment added to the substation. (See Section 4.2.2 for a discussion of visual impacts.)

4.1.2.2 Recommended Mitigation

BPA would compensate landowners for any farmland removed from production. Compensation would be offered for the fair market value of the land rights acquired. The USFS would be compensated for the fair market value of their timber (see Appendix G, **Property Impacts**).

Impacts would be mitigated by the following measures:

- Work closely with the USFS, other land managers and landowners to minimize conflicts and inconvenience from construction and maintenance activities.
- Locate structures outside of agricultural fields where possible or next to existing structures and schedule activities to avoid crop damage.
- Compensate farmers for crop damage, help them control weeds, and restore compacted soils.
- Keep gates and fences closed and in good repair to contain livestock.
- Strive to meet Teton County Development Regulations.
- Continue to work with Teton Substation neighbors on Teton Substation design and placement of new structures and equipment.

4.1.2.3 Cumulative Impacts

Removal of agricultural land, rangelands, and timberlands from production would be an incremental increase in lands lost to previous development and to future development that were not necessarily intended to be used for utilities.

There would be cumulative impacts to neighbors of Teton Substation from adding equipment in the substation. The substation was built in 1968. At that time, no residential neighborhoods existed in the vicinity. As time has passed, residences have been built so that they now surround the substation on three sides. Expanding utilities in neighborhoods can cause conflict in land uses. As utility infrastructure continues to be needed, this conflict can continue.

4.1.3 Single-Circuit Line Alternative

4.1.3.1 Impacts

Impacts would be the same as the Agency Proposed Action except for the following: an additional single-circuit line crossing the last 1.6 km (1 mile) of pasture land to Teton Substation would create low to moderate long-term impacts because a small amount of land occupied by the legs of the new transmission structures could no longer be used for grazing.

4.1.3.2 Recommended Mitigation

- Mitigation would be the same as the Agency Proposed Action, Section 4.1.2.2.

4.1.3.3 Cumulative Impacts

Impacts would be the same as in Section 4.1.2.3.

4.1.4 Short Line Alternative

4.1.4.1 Impacts

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap to Teton Substation.

Additional impacts include construction of the switching station near Targhee Tap. The switching station may be placed in a pasture north of structures 18/3 and 18/4 near the mouth of Pole Canyon. The potential long-term impacts would be moderate and

would include the permanent removal of 1-2 hectares (3-5 acres) from production and altered grazing practices. Short-term impacts would include soil compaction around the area surrounding the switching station construction site and a subsequent decrease in soil productivity.

4.1.4.2 Recommended Mitigation

- Mitigation would be the same as the Single-Circuit Line Alternative.
- Locate structures and the switching station to minimize interference with nearby agricultural activities.

4.1.4.3 Cumulative Impacts

Impacts would be the same as in Section 4.1.2.3. In addition, livestock displacement from the permanent loss of pasture from switching station construction could cause nearby lands to be converted to pasture. Impacts would be low because a small amount of land would be removed from production.

4.1.5 SVC Alternative

4.1.5.1 Impacts

Because the SVC would be placed within property boundaries at Teton Substation, no changes in land use would be required. Also, landscaping referred to in Section 4.1.2.1 would help screen new SVC equipment.

The addition of an SVC at LVPL's Jackson Substation would require expanding the existing substation by about 2000 m^2 (0.5 acre) to the north. Since the substation already exists within a residential/commercial area, the expansion would cause no to low impacts.

4.1.5.2 Recommended Mitigation

- Strive to meet the Teton County Development Regulations.
- Continue to work with Teton Substation neighbors on Teton Substation design and placement of new equipment.

4.1.5.3 Cumulative Impacts

Impacts would be the same as in Section 4.1.2.3.

4.1.6 No Action Alternative

No impacts to land use are expected.

4.2 Visual Resources

For Your Information

Construction, operation and maintenance of transmission line and substation facilities can have short and long-term effects on visual resources. Structures, conductors, insulators, spacers, aeronautical safety markings, ROW clearing, access roads, clearing for structures, and pulling sites for the conductor can create an impact. Distance from sensitive viewpoints decreases visibility. Different landforms and vegetation influence visual impact; some are more able to screen transmission line features.

Facilities can be seen from potential viewpoints such as private residences, highways, and commercial areas. Locating facilities in areas where soils are highly erodible or have poor potential for revegetation can also create impacts. A transmission line's visual presence would last from construction through the life of the line.

4.2.1 Impact Levels

Because most of the existing ROW is on USFS land, impact definitions correspond to USFS guidelines for visual resource management (US Department of Agriculture, Forest Service, 1974).

Impacts would be considered **high** where:

- the transmission line ROW would become the dominant feature or focal point of the view,
- a large number of highly sensitive viewers view the ROW in predominantly the foreground and middleground of the view.

Impacts would be considered **moderate** where:

- the ROW would be clearly visible in the view but not the dominant feature of the view,
- a large number of sensitive viewers view the ROW mostly in the middleground of the view.

Impacts would be considered **low** where:

- the ROW is somewhat visible but not evident in the view,
- few sensitive viewers would see the ROW because it is screened, or predominantly viewed in the middleground and background of the view.

No impacts would occur where:

- the ROW is isolated, screened, not noticed in the view, or is seen at great distance,
- views would be of short duration,
- no visually sensitive resources would be affected.

4.2.2 Agency Proposed Action

4.2.2.1 Impacts

Visual impacts during construction would include:

- views of construction equipment in the ROW;
- views of fresh road cuts in some areas prior to restoration;
- construction staging areas along Idaho State Routes 31 and 33 and Wyoming State Route 22; and
- views of cranes over tree tops during structure assembly.

Reminder

See Map 4 for a review of visual assessment areas.

These impacts would occur along the ROW during construction but would be most apparent in Visual Assessment Areas 2-7.

After the line is built, operation and maintenance of the ROW would create low to high impacts depending on the viewpoint and viewer sensitivity.

Visual Assessment Area 1, Swan Valley — The ROW would be somewhat more visible in the background in the Swan Valley area with the added structures and conductors. ROW widening would be disguised in the foreground since farmers would continue to grow crops under the transmission lines.

Tourists are not expected to notice the transmission line more than during construction. Residential viewers may notice the additional structures and conductors immediately following construction, particularly if they view the ROW in the middle of the view. However, the transmission line would not be the dominant feature in any residential view. Visual impacts would be low.

Reminder

Foreground *is within 0.4 to 0.8 km (0.25 to 0.5 mile) of the viewer;* ***middleground*** *is from the foreground to about 8 km (5 miles) of the viewer; and* ***background*** *is over 8 km (5 miles) from the viewer.*

These distance zones were defined by the visual resource specialist based on Forest Service standards and a site visit.

Visual Assessment Area 2, State Route 31/Targhee National Forest — Tourists and recreationists traveling through this area and using the Targhee National Forest would see more predominant views of the ROW. Figure 4-1 simulates changes to this area. Foreground views would remain the same. The ROW would be more clearly visible in the middleground because mature coniferous vegetation would be cleared and transmission line structures and conductors would be added. Transmission line road crossings would become more dominant because of the addition of conductors and, in the Pine Creek area, possible marker balls to alert pilots and birds to the lines. Impacts would be moderate.

Pine Creek Routing Option A — This option would cause slightly greater impacts to visual resources than locating the line right next to the existing line (Option B). This is due to increased visibility of the line for a short distance along State Route 31 as it comes down the forested west facing slope to meet the existing

ROW, and then crosses the highway. It is also due to the addition of another corridor clearing uphill of the existing corridor, and the impacts to views of the ridgeline from the day camp on the south side of the highway.

Pine Creek Routing Option B — This option would cause the lowest impact of the options because fewer mature trees would be lost to clearing, no separate corridors would be added to the viewshed, and the line would be less visible from the highway, except where it crosses the highway. However, construction scars on the landscape of the rugged rocky cliffs would be slow to revegetate and would require a longer period of time to be screened by vegetation.

Pine Creek Routing Option C — This option would cause somewhat greater impacts to visual resources than Options A and B. It would be more visible from the highway, particularly westbound, and would add an additional highway crossing. It would also encircle the day camp with transmission lines although they would not be very close.

Visual Assessment Area 3, South of Victor/State Route 33 — Residential viewers would see more predominant views of the ROW and Targhee Tap. The ROW would be more clearly visible in the middleground and background because mature coniferous vegetation would be cleared and transmission line structures and conductors would be added. (See Figure 4-2.) Because more facilities would be added around Targhee Tap, it may become more visible in the view, depending on siting of the facilities. Impacts would be moderate.

Visual Assessment Area 4, Idaho State Route 33 and Wyoming State Route 22/Targhee National Forest — Tourists and recreationists would see more predominant views of the ROW. Changes in the view would be similar to those shown in Figure 4-2. Foreground views would remain the same. The ROW would be more clearly visible in the middleground because mature coniferous vegetation would be cleared and transmission line structures and conductors would be added. Transmission line road crossings approaching the summit of Teton Pass would become more dominant because double-circuit structures are taller than existing structures, conductors would be added, and marker balls may be added. Just before the summit of Teton Pass the transmission lines may be viewed in the foreground. However, the lines would not be the dominant feature. Impacts would be moderate.

Visual Assessment Area 5, Summit of Teton Pass/Bridger-Teton National Forest — Tourists and recreationists would see more predominant views of the ROW. (See Figure 4-3.) Foreground views would remain the same. The ROW would be more clearly visible in the middleground because mature coniferous vegetation would be cleared and transmission line structures and conductors

would be added. Some double-circuit structures would be used and would require no additional clearing in these areas. Transmission line road crossings approaching the summit of Teton Pass would become more dominant because conductors would be added, and marker balls may be added. A construction access road from abandoned State Route 22 would be somewhat more visible in the view. Impacts would be moderate. For a short section of ROW at Teton Pass summit, impacts would be high because the transmission line may be viewed in the foreground. The line would be within the boundary of the Palisades Wilderness Study Area, where no modification to visual resources is the preferred visual resource management approach for the USFS.

Visual Assessment Area 6, Ski Lake Trail/Bridger-Teton National Forest — Recreationists would see more predominant views of the ROW. (See Figure 4-4.) Foreground views would remain the same. The ROW would be more clearly visible in the middleground because mature coniferous vegetation would be cleared and transmission line structures and conductors would be added. Impacts would be moderate.

Visual Assessment Area 7, Residential Neighborhoods Next to Teton Substation — The ROW would be more evident in the view from the residential neighborhood next to Teton Substation. (See Figure 4-5.) In most locations, the ROW is in the middleground except for a row of condominiums directly south of the ROW, from which the transmission lines would be in the foreground.

An overhead line approach into Teton Substation will require new equipment at Teton Substation. These additions (equipment as high as 16.5 m (54 feet) would make it more visible to residents, causing a moderate impact except for about four residences, where impacts would be high.

Underground Line Termination Option at Teton Substation - This option would cause lower visual impacts to residences immediately adjacent to the substation when compared to going in with an overhead line. Some of the same types of equipment are needed with this option but the maximum height would reach 6.4 m (21 feet) in the substation, compared to 16.5 m (54 feet) going in with an overhead line.

4.2.2.2 Recommended Mitigation

The following mitigation measures would reduce impacts in the Visual Assessment Areas.

Visual Assessment Area 1, Swan Valley

- Treat structures and related hardware to reduce reflectivity; paint structures with Fed Standard 36300 (gray tone) or similar non-lustrous treatment to match existing steel structures.

- Use non-reflective conductors.
- Use non-luminous insulators (i.e., non-ceramic insulators [a polymer] or porcelain that match existing lines).
- Site new structures next to or very near existing structures and use the same structure type. This would lessen visual clutter that can result when different types of structures are visible in a vast open landscape.
- Install new conductor at about the same height as existing conductor to lessen visual clutter.

Visual Assessment Area 2, State Route 31/Targhee National Forest

- Treat structures and related hardware to reduce reflectivity; paint structures with Fed Standard 36300 (gray tone) or similar non-lustrous treatment to match existing steel structures.
- Use non-reflective conductors.
- Use non-luminous insulators (i.e., non-ceramic insulators [a polymer] or porcelain that match existing lines).
- When clearing forested ROW areas, take additional trees in random locations beyond the additional ROW to create a jagged (scalloped or feathered), more natural edge to the clearing. This would blend the ROW into the surrounding vegetation rather than forming a clear straight line across the mountains. Develop clearing plans that use the smallest amount of clearing to achieve this effect.
- Site new structures very near existing structures and use the same type of structure to lessen visual clutter along the ROW.

For Your Information

Preserving the existing topsoil involves stripping the top 15-30.5 cm (6-12 inches) of topsoil, stockpiling it, protecting the stockpile, recontouring the site, and spreading the soil.

- Preserve the existing topsoil within the ROW by stockpiling it during construction and spreading it after construction so native plant communities would regenerate and blend exactly with the surroundings.
- Use techniques as needed to revegetate cut and fill slopes on access roads and near structure locations.
- Minimize, where possible, access road placement in highly sensitive areas.

Visual Assessment Area 3, South of Victor/State Route 33

- All mitigation measures listed for Visual Assessment Area 2 apply.

Visual Assessment Area 4, Idaho State Route 33 and Wyoming State Route 22/Targhee National Forest

- From structures 26/8 to 27/6, double-circuit structures are highly recommended.

Visual Assessment Area 5, Summit of Teton Pass/Bridger-Teton National Forest

- Treat structures and related hardware to reduce reflectivity; paint structures with Fed Standard 36300 (gray tone) or similar non-lustrous treatment to match existing steel structures.
- Use non-reflective conductors.
- Use non-luminous insulators (i.e., non-ceramic insulators [a polymer] or porcelain that match existing lines).
- BPA and LVPL will work with the USFS to meet the requirements of the Palisades Wilderness Study Area designated ***Partial Retention***.
- Double circuit the transmission line from 28/5 (possibly 27/7) to 29/6 to eliminate the need to clear a wider easement.
- When clearing the forested ROW along Phillips Ridge (structures 30/5 to 35/1), take additional trees in random locations beyond the additional ROW as described under Visual Assessment Area 2.
- Preserve the existing topsoil within the ROW.

Visual Assessment Area 6, Ski Lake Trail/Bridger-Teton National Forest

- Treat structures and related hardware to reduce reflectivity; paint structures with Fed Standard 36300 (gray tone) or similar non-lustrous treatment to match existing steel structures.
- Use non-reflective conductors.
- Use non-luminous insulators (i.e., non-ceramic insulators [a polymer] or porcelain that match existing lines).
- When clearing forested ROW through this area, take additional trees in random locations beyond the additional ROW as described under Visual Assessment Area 2.
- Site new structures very near existing structures as described under Visual Assessment Area 2.
- Preserve the existing topsoil within the ROW.

For Your Information

Partial Retention *is defined as an area where project activities can be apparent but not dominant.*

Visual Assessment Area 7, Residential Neighborhoods Next to Teton Substation

- Landscaping referred to in Section 4.1.2.1 would help screen new equipment from residents surrounding Teton Substation.
- Treat structures and related hardware to reduce reflectivity; paint structures with Fed Standard 36300 (gray tone) or similar non-lustrous treatment.
- Use non-luminous insulators (i.e., non-ceramic insulators [a polymer] or porcelain).
- Strive to meet Teton County Development Regulations.
- Continue to work with Teton Substation neighbors on Teton Substation design and placement of new structures and equipment.

4.2.2.3 Cumulative Impacts

Impacts are caused by the addition of the new ROW and transmission line. The level of impact is variable and dependent on viewer type and sensitivity. Addition of any new development along the ROW in the national forests and on private land reduces the visual quality of the area. Individuals driving for pleasure would see the new structures. Residents near Teton Substation would experience an incremental decrease in the visual quality around their homes.

4.2.3 Single-Circuit Line Alternative

4.2.3.1 Impacts

Impacts would be the same as the Agency Proposed Action in Visual Assessment Areas 1-7.

4.2.3.2 Recommended Mitigation

- Refer to measures under Agency Proposed Action, Section 4.2.2.2.
- In Visual Assessment Area 7, site new structures very near existing structures, use the same structure type, and sag the conductor the same as existing conductors to lower visual clutter along the ROW.

4.2.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.2.2.3).

4.2.4 Short Line Alternative

4.2.4.1 Impacts

Impacts would be the same as those described for the Agency Proposed Action in Visual Assessment Areas 4, 5, 6, and 7.

At Visual Assessment Area 3, impacts would be the same as described under the Agency Proposed Action, except there would be no impacts west of Targhee Tap.

There would be increased construction impacts in the area south of Victor because a 1-2 hectare (3-5 acre) switching station would be built near Targhee Tap. However, careful placement on the valley floor below the existing tap behind surrounding trees would minimize the visual impacts of the new station.

4.2.4.2 Recommended Mitigation

- Mitigation would be the same as described for Visual Assessment Areas 3-7 of the Single-Circuit Line Alternative (see Section 4.2.3.2).

4.2.4.3 Cumulative Impacts

Impacts are caused by the addition of the new ROW, transmission line and switching station. The level of impact is variable and dependent on viewer type and sensitivity. New development would reduce the visual quality of the area.

4.2.5 SVC Alternative

4.2.5.1 Impacts

At Visual Assessment Area 7, residential areas surrounding Teton Substation would experience visual impacts. Construction activities would create temporary but visible impacts for residents.

Adding new equipment at Teton Substation in the foreground and middleground would make it the dominant feature in the view for nine single-family homes and one condominium building with about eight units. This would be a high impact.

Adding new equipment at Jackson Substation would impact this mixed use area of RV parks, motels and other commercial businesses, but the expansion of the substation yard would create low overall impacts. Construction activities would create temporary but visible impacts because tourists and other seasonal viewers could see the activities.

4.2.5.2 Recommended Mitigation

- Landscaping referred to in Section 4.1.2.1 would help screen new equipment from residents surrounding Teton Substation.
- Strive to meet the Town of Jackson and Teton County Development Regulations.
- Continue to work with Teton Substation neighbors on Teton Substation design and placement of new structures and equipment.

4.2.5.3 Cumulative Impacts

Cumulative impacts would be created by adding more equipment to Teton Substation located in a residential neighborhood where residents are sensitive to surrounding views, or at Jackson Substation in a mixed commercial-residential area.

4.3 Recreation Resources

4.3.1 Impact Definitions

For Your Information

*Map 9 displays **ROS** designations in the project vicinity for Targhee and Bridger-Teton National Forests.*

Because most of the proposed ROW would be on land managed by the USFS, impact definitions were developed by the recreation specialist but correspond to USFS Recreation Opportunity Spectrum (***ROS***) guidelines for recreation resource management. ROS categories are described in the box on the next page.

Impacts would be **high** where:

- A major change in the ROS designation would occur (changing two categories or more) for an area.
- Motorized access/use would be terminated in motorized areas, or excess nonmotorized use would be encouraged in nonmotorized areas.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum was developed by the USFS to provide direction for land management and recreation planning within national forests. ROS classes are used to identify current recreation uses and to help specify the type and management of activities planned for the future. Categories are defined in terms of a combination of setting, experience, and activities. The following are in the project area:

- **Semi-Primitive Nonmotorized (ROS II):** Predominantly natural environment or natural-appearing environment of moderate to large size. Interactions between users is low, but there is often evidence of other users. There are minimum on-site controls, or restrictions may be present but are subtle. Motorized use is not permitted.
- **Semi-Primitive Motorized (ROS III):** Predominantly natural environment or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. There are minimum on-site controls, or restrictions may be present but are subtle.
- **Roaded Natural Appearing (ROS IV):** Predominantly natural-appearing environments with moderate evidences of the sights and sounds of humans. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.
- **Rural (ROS V):** Substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are often provided for special activities. Moderate densities are accommodated away from developed sites. Facilities for intensified motorized use and parking are

Impacts would be **moderate** where:

- Some change in ROS designation would occur (changing one category) for an area.
- Some motorized access would be terminated or some excess nonmotorized access/use would be encouraged.

Impacts would be **low** or **no impact** would occur where:

- No ROS change would occur.
- No motorized or nonmotorized access or use levels would change.

4.3.2 Agency Proposed Action

4.3.2.1 Impacts

Construction would create temporary recreation impacts because of clearing, road construction, structure installation, and conductor stringing and tensioning.

A portion of the new ROW along State Route 33 and State Route 22 would become somewhat more visible to tourists traveling through the area. However, the line is not expected to become the dominant feature in the landscape, nor is it expected to change the perception of tourists that this is a highly scenic area.

Motorized Recreation — Those access roads that are open to motorized recreation (very limited on the Targhee) would be closed one at a time to accommodate grading equipment and construction access. Access for motorcycles and ATV's on the Targhee National Forest would be limited on the few access roads (only roads between structures 15/2 and 20/10 or Murphy Creek to the highway crossing of Idaho State Route 33) allowing their use during construction in those areas. Use of Phillips Ridge on the Bridger-Teton National Forest for parasailing would be restricted during construction. Impacts would be moderate, but temporary.

Once the line is built, impacts to motorized recreation would be low to moderate. No changes to ROS designations would be required. At the USFS request, BPA will gate access roads. Gates on all access roads could have these impacts:

- significantly less use of Phillips Ridge for parasailing because it would be very difficult to transport equipment to the ridge,
- fewer opportunities for vehicle camping, and
- limited opportunities for snowmobiling along access roads, particularly along the Phillips Ridge area where high-country snowmobiling is popular.

Nonmotorized Recreation — Temporary impacts on nonmotorized recreation during construction are expected to be in the form of inconvenience mostly limited to summer recreationists using the area for hiking, camping, mountain biking, horseback riding, and hunting/fishing. Recreationists would have to share access roads with construction equipment. They would view construction activities including machinery motion, cranes, and fresh roadcuts. Construction activity is expected to stop in high-use winter recreation areas. Impacts would be low.

Impacts to nonmotorized recreation would be low to moderate because no changes to ROS designations would be required along the proposed ROW. In addition, gating all access roads is not expected to impact nonmotorized recreation because most users simply walk around or scale gates easily. Since gates would prevent motorized travel, there could be fewer conflicts between motorized and nonmotorized users.

Nonmotorized recreationists would experience some changes in visual quality; see Section 4.2, **Visual Resources**.

Pine Creek Routing Option A — Locating the line farther up the hill could create an additional access point for hikers and hunters on foot for a short distance along the corridor. Impacts would not change from those mentioned above.

Pine Creek Routing Option B — Impacts would not change from those mentioned above.

Pine Creek Routing Option C — This option could create an additional hiking route around the south side of the day camp and could provide additional hiking access to Pine Creek at the new highway crossing. Impacts would not change from those mentioned above.

4.3.2.2 Recommended Mitigation

- Use mitigation in Section 4.2, **Visual Resources** to reduce impacts to the visual experience of recreationists and sightseers.
- Coordinate with each Ranger District on the Targhee and Bridger-Teton National Forests to develop gating plans that would promote the types and levels of use desired at each access road.

4.3.2.3 Cumulative Impacts

If some roads are gated, and motorized and non-motorized recreation is restricted, some recreationists would be displaced from areas now being used. This could cause recreationists to use other existing developed areas more, which could create a need for new open areas at some other location. Displacement and crowding in other areas could have a negative effect on recreation experiences. Crowding in small areas could cause impacts to soils, vegetation, wildlife and water resources.

4.3.3 Single-Circuit Line Alternative

4.3.3.1 Impacts

Impacts would be the same as the Agency Proposed Action.

4.3.3.2 Recommended Mitigation

- Refer to measures listed under the Agency Proposed Action, Section 4.3.2.2.

4.3.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action.

4.3.4 Short Line Alternative

4.3.4.1 Impacts

For both motorized and nonmotorized recreation, impacts would be the same as those listed for the Single-Circuit Line Alternative east of Targhee Tap.

The switching station is not in a high-use recreation area so there would be no impact at this site.

4.3.4.2 Recommended Mitigation

Mitigation would be the same as for the Single-Circuit Line Alternative.

4.3.4.3 Cumulative Impacts

Cumulative impacts would be the same as for the Single-Circuit Line Alternative.

4.3.5 SVC Alternative

4.3.5.1 Impacts

Construction, operation and maintenance activities would cause no impacts to recreation because Teton Substation is not in the vicinity or within clear view of any recreation areas. No mitigation would be required and there would be no cumulative impacts.

Jackson Substation is near a ski area, but it is in an area with mixed commercial and residential uses. No impacts to recreation are expected. No mitigation would be required and there would be no cumulative impacts.

4.3.6 No Action Alternative

There would be no direct impacts to recreation from the No Action Alternative, and no mitigation would be required.

For Your Information

The Public Health and Safety Section gathers different potential causes of impacts of concern to the public in one section. Impact levels are not defined for this section because specific measurements and/or research about impacts is inconclusive.

4.4 Public Health and Safety

4.4.1 Safety Precautions

Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. These precautions include building the lines to minimize shock hazard. All BPA lines are designed and constructed in accordance with the National Electrical Safety Code (***NESC***). NESC specifies the minimum allowable distances between the lines and the ground or other objects. These requirements basically determine the edge of the right-of-way and the height of the line, that is, the closest point that houses, other buildings, and vehicles are allowed to the line.

People must also take certain precautions when working or playing near power lines. It is extremely important that a person not bring anything, such as a TV antenna or irrigation pipe, too close to the lines. BPA provides a free booklet that describes safety precautions for people who live or work near transmission lines (*Living and Working Safely Around High Voltage Power Lines*).

4.4.2 Electric and Magnetic Fields

Because the state of scientific evidence relating to EMF has not yet established a cause-and-effect relationship between electric or magnetic fields and adverse health effects, BPA is unable to predict

specific health risks, or specific potential level of disease, related to exposure to EMF. BPA has conducted ***exposure assessments*** of magnetic fields from transmission lines. Exposure assessments are estimates of the field levels to which people are potentially exposed.

A magnetic field exposure assessment is done by first identifying the areas along the ROW where homes and businesses exist nearby. For these areas, engineers estimate what future magnetic field levels would be without the new project. This analysis serves as a baseline measurement. Engineers then estimate the possible change in field levels assuming the proposed project is in place. An increase in public exposure is defined as a situation where field levels with the new project would increase and buildings exist nearby. These field levels are only indicators of how the proposed project may affect the magnetic field environment. They are not measures of risk or impact on health.

The most heavily populated area along the existing ROW is the 1.6 km (1 mile) stretch just west of Teton Substation. Numerous homes and condominiums are located near the ROW. Calculations were done to compare magnetic fields along the ROW for the five proposed alternatives (No Action, SVC, Short Line and Single-Circuit Alternatives, and Agency Proposed Action). A graph of this comparison is in Appendix C, **EMF**.

For Your Information

Double-circuit designs, such as those proposed in the Agency Proposed Action, provide a unique opportunity to reduce or minimize magnetic fields through "field cancellation" techniques. If the electrical phase conductors on the transmission lines are properly and exactly arranged, the magnetic fields produced by the individual conductors tend to partially cancel each other. The resulting magnetic field levels then decrease more quickly with distance compared to other double-circuit phasing arrangements or single-circuit lines. These cancellation techniques would be used on the double-circuit portions of the Agency Proposed Action.

The calculations show that the Agency Proposed Action (double-circuit structures are proposed for this area) results in lower field levels than the No Action Alternative on both sides of the ROW.

Both the Single-Circuit and Short Line Alternative (structures would look the same as what is there now) would result in somewhat lower field levels on the south side of the ROW compared to the No Action Alternative. Since the new line would be located north of the existing line, field levels would be higher than the No Action Alternative on the north side of the ROW.

Since no new transmission line is included in the SVC Alternative, no change to the magnetic field level is expected when compared to the No Action Alternative.

4.4.3 Noise

Idaho and Wyoming have no state noise regulations. However, Teton County, Wyoming and the Town of Jackson have noise regulations limiting noises in certain zoning districts to 55 ***dBa*** at the property boundary line. The Federal Noise Control Act of 1972 (42 U.S.C. 4903) requires that federal entities, such as BPA, comply with state and local requirements regarding noise.

4.4.3.1 Construction Noise

Noise impacts would result from construction activities. Construction noise would be short term, would occur mostly during the summer, and would typically occur for only a few days at any one location such as near a residence.

4.4.3.2 Transmission Line Noise

Audible noise can be produced by transmission line corona for lines of 345-kV and above. Since the Agency Proposed Action, Single-Circuit Line Alternative, and the Short Line Alternative are less than 345-kV, there would be no increase in the ambient audible noise level along the route.

4.4.3.3 Substation Noise

If the SVC alternative is selected, there would be an additional noise source within Teton or Jackson substations. Noise would increase depending on background levels and operating modes of the SVC equipment. Noise generated from the new equipment at either site would be the same. The SVC would be designed so that the maximum noise level would be at 55 dBa at the property line of either substation to meet Teton County and Town of Jackson standards.

4.4.4 Radio and TV Interference

Federal Communications Commission (***FCC***) regulations require that incidental radiation devices (such as transmission lines) be operated so that radio and televisions reception would not be seriously degraded or repeatedly interrupted. Further, FCC regulations require that the operators of these devices mitigate such interference.

Reminder

EMI (electromagnetic interference) is a high-frequency noise caused by corona that can cause radio and television interference.

BPA policy is to comply with FCC requirements. While none of the proposed alternatives are expected to increase EMI above existing levels, each complaint about EMI would be investigated. If the Agency Proposed Action, the Single-Circuit Line Alternative or the Short Line Alternative is implemented and found to be the source of radio or television interference in areas with reasonably good reception, measures would be taken to restore the reception to a quality as good or better than before the interference.

Overall, BPA receives very few radio interference (***RI***) or television interference (***TVI***) complaints. BPA strives to correct all complaints and most are satisfactorily corrected. As a result of these factors RI/TVI impacts would be minimal.

4.4.5 Toxic and Hazardous Materials

Several common construction materials (e.g., concrete, paint, and wood preservatives) and petroleum products (e.g., fuels, lubricants, and hydraulic fluids) would be used during construction. BPA and LVPL would follow strict procedures for disposal of these or any hazardous materials. No impacts would occur.

Some of the new line termination equipment required for the Agency Proposed Action, Single-Circuit Line Alternative or Short Line Alternative would contain oil. The transformer used for the SVC Alternative would also contain oil. The spill containment system at Jackson Substation would most likely be extended to include the expansion for the SVC. At Teton Substation, a spill plan will be put in place this summer and will outline response activities in case of a spill. BPA would also consider installing oil spill containment around the transformer.

4.4.6 Fire

Construction of the new transmission line would take place during spring, summer and fall. The construction season would be short, with most activities occurring during summer when the weather is hot and dry. The potential for a large fire is high because of the mostly mature trees that surround the existing ROW, but it increases even more with the increased use of vehicles, chainsaws and other motorized equipment. The addition of construction workers in the area also elevates the potential for fire.

For Your Information

*The **Project Plan** is permanent documentation of agreements made between land managers (in this case BPA and the USFS). The Plan identifies methods for improving or creating roads, clearing trees and other vegetation, erosion control, fire control, protection of special resources, and mitigation.*

BPA, in concert with the USFS, would prepare a ***Project Plan*** that includes a Fire Plan to ensure that fire hazards are kept low. The Fire Plan would address the needs and requirements of the USFS and BPA.

BPA maintains a safe clearance between the tops of trees and power lines to prevent fires and other hazards. Electricity can arc from the conductor to a treetop. Generally, trees are not allowed to grow over 6 m (20 feet) high on the ROW. Trees that need to be cleared from the ROW, and any trees that could fall into the line (danger trees) would be marked and removed.

Operating transmission lines that use wood pole structures have the potential to initiate fires in the poles under certain atmospheric conditions. Where metal on a structure touches wood, heat can build up and wind can cause the wood to ignite. BPA prevents fires in wood pole structures by electrically connecting together the metal parts in the structure. When the parts are electrically connected, heat is dissipated and does not pose the same fire risk. This method has been successfully used by BPA for more than 30 years.

4.4.7 No Action Alternative

The No Action Alternative could lead to voltage collapse if a critical line is lost on the system. Collapse of the system could continue over a long period (a week or more) if outages occur in winter when deep snows make access to the existing transmission system difficult.

When electricity is lost lighting for safe locomotion and security is lost. Residential consumers lose heat. Traffic signals fail. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential customers. Sewage transportation and treatment can be disrupted.

Electricity for cooking and refrigeration is lost. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments.

The No Action Alternative has negative public health and safety impacts.

For Your Information

Impacts to water, soils, and geology are interrelated and have been combined.

Impacts are based on a site's susceptibility to long-term degradation. Erosion and mass movement prone areas, soils susceptible to compaction, steep slopes, and extensive access road and clearing requirements increase an area's vulnerability. Disturbance of the surface and subsurface and removing vegetation increase the risk of soil erosion and mass movement, and may change soil productivity. Impacts may be great in areas sensitive to rill and gully erosion, and land movement. Runoff could increase sedimentation and water turbidity. Road improvements and vehicular traffic at stream crossings could increase stream turbidity and alter stream channels.

Nutrients leached from disturbed agricultural soils or transported on soil particles could stimulate undesirable aquatic vegetation growth. Clearing streamside vegetation increases a stream's exposure to sunlight, possibly raising water temperature.

For related water quality effects, see separate discussions under Sections 4.6 ***Floodplains and Wetlands,*** *4.8* ***Wildlife,*** *and 4.9* ***Fisheries****.*

4.5 Water Quality, Soils and Geology

4.5.1 Impact Levels

A **high** impact would occur where:

- A water body that supports sensitive fish, waterfowl, and animal habitat, and/or human uses such as drinking water would be extensively altered so as to affect its uses or integrity.
- The possibility of oil spills from substation equipment reaching groundwater is high, such as in shallow groundwater areas, highly ***permeable*** soils, and no secondary spill containment or protective measures are used.
- Water quality degrades below state or USFS standards and site conditions are so unfavorable that major reclamation, special designs or special maintenance practices are required.
- Road or facility construction and/or clearing are required on sites prone to mass movement or with a very high susceptibility to erosion.
- Soil properties or site features are so unfavorable or difficult that standard mitigation measures, including revegetation, would be ineffective.

- Long-term impacts associated with accelerated erosion, sedimentation, or disruption of unstable slopes would occur.

A **moderate** impact would occur if:

- Water quality degrades below state or USFS standards, but it can be partially mitigated. Site conditions require special planning and design.
- Construction and clearing take place near a water body on erodible soils with moderate revegetation potential.
- Where new roads would be constructed across a stream or where existing stream crossings are inadequate and would require rebuilding.
- Impacts continue to occur until disturbed areas are re-claimed and sediment is no longer transported to surface waters.
- Soil properties and site features are such that mitigation measures would be effective in controlling erosion and sedimentation within acceptable levels.
- Impacts would be primarily short term with a significant increase in normal erosion rates for a few years following soil disturbance until erosion and drainage controls be-come effective.
- There is little possibility of oils or other pollutants affecting groundwater, because groundwater level is deep, soils are relatively non-porous, and facilities have some minor spill protective measures.

A **low** impact would occur if:

- Impacts to water quality could be easily mitigated to state or USFS standards with common mitigation measures.
- Structures or access roads near water bodies are in stable soils on gentle terrain, with little or no clearing.
- Structures are away from waters' banks and little or no sediments reach the water.
- There is little or no possibility of oil or other pollutants affecting groundwater; groundwater is deep, soils are relatively non-porous, and facilities have good oil spill containment protective measures.
- Where there would be no construction or major recon-struction of roads.

- Road and facility construction and clearing would be required on soils with a low to moderate erosion hazard and the potential for successful mitigation is good using standard erosion and runoff control practices.
- Erosion and sedimentation levels would be held near normal during and following construction.

No impact would occur where water quality and soils would remain unchanged.

4.5.2 Agency Proposed Action

4.5.2.1 Impacts

Direct impacts would be caused by access road construction and improvements and maintenance activities, ROW clearing, and site preparation for structures and other facilities. These activities would disturb the soil surface; increase erosion, runoff and sedimentation in nearby water courses; and impair soil productivity. Until final designs are completed, the amount of soil exposed by project construction can only be estimated. About 8-16 km (5-10 miles) of new access roads would be required. Most of this new access is in steep terrain, which because of road cut and fill slope requirements, increases the area of earth materials exposed. New access road and structure construction would expose an estimated 18-45 hectares (45-110 acres) of earth materials. Following construction, implementation of optimum erosion controls and revegetation of disturbed sites (cut and fill slopes and structure sites) would reduce the amount of exposed earth materials. Impacts would be greatest in local sensitive areas susceptible to ***rill*** and gully erosion, and areas of unstable soil or rock. Short-term impacts during and following construction would be most intense. Intensity of long-term impacts would be directly proportional to the success of revegetation, and erosion and runoff control efforts. Impacts to water and soils are summarized in Table 4-1.

Reminder

*A **rill** is a channel made by a small stream.*

See Map 7 for soil limitations.

Pine Creek Bench, Idaho — From the Swan Valley Substation to the mouth of Pine Creek Canyon (structure 5/2) the transmission line would traverse the nearly level Pine Creek Bench. The loess soils have a moderate erosion hazard if disturbed, except on the steep side slopes of drainages dissecting the Bench, where the erosion hazard is very high (U.S. Department of Agriculture, Soil Conservation Service, July 1981). The project crosses a steep-sided intermittent tributary to Rainey Creek between Swan Valley Substation and structure 1/1 and then parallels the drainage to structure 1/3. No permanent access would be constructed through or parallel to the drainage.

Map 2 shows structure numbers and locations. Map 6 shows township, section and range.

Table 4-1. Impacts to Water and Soil Resources

Area	Actions	Impacts to Soil	Impacts to Water Resources
Pine Creek Bench, structures 1/1-5/1	No permanant access. Structures in grain fields; cut trees and vegetation at Pine Creek Crossing.	low, direct, short-term; erosion; soil compaction; increased runoff, loss of productive soils	low
structures 5/1-6/1	structure and road improvements	low	short-term low; sedimentation in drainages
structures 6/2-6/9	new access roads; blasting	moderate to high; talus destabilized; rockfall hazard; increased runoff; erosion	low; possible sedimentation in intermittent drainages
structures 6/12-7/1	Access adjacent to wetland	sediment in wetland	sediment in wetland
structures 8/2	modify or replace bridge; disturb streambank and channel	moderate; erosion	moderate; short-term increased stream turbidity and sedimentation
structures 7/4-7/8	clearing and structure construction	low to moderate; erosion	short-term low to moderate; increases in sedimentation and stream turbidity; peak streamflows increased
structures 8/3-8/7	bedrock ripping or blasting, clearing; road construction.	moderate; erosion	short-term, moderate; sediment in streams
structures 8/5-8/10	new access road construction; ripping or blasting bedrock; clearing	moderate to high; erosion, sedimentation	short-term, moderate; sediment in streams
structures 8/10-9/5	replace ford with temporary or permanent bridge	moderate; erosion	low to moderate; short-term stream turbidity
structures 9/4-10/3	new access road construction; clearing	moderate; increased runoff, sedimentation	low
structures 10/3-11/6	replace bridge, road construction, clearing	moderate; erosion, rutting	short-term moderate; increased stream turbidity, sediment into Tie Creek.
structures 12/1-12/6	structure construction	moderate; erosion	short-term; moderate sedimentation

Table 4-1. continued

Area	Actions	Impacts to Soil	Impacts to Water Resources
structures 12/1-14/2	ROW clearing; upgrading access	erosion; sediment; low-moderate	low-moderate sedimentation
structures 13/5-14/3	construction; clearing;	moderate; erosion	short-term moderate; sedimentation
Coalmine Fork crossing	upgrade crossing (if needed)	erosion	short-term moderate; increased stream turbidity
structures 14/6-15/4	clearing; use of fords (Murphy and Little Pine Creeks); install culvert	erosion	short-term; increased stream turbidity; sedimentation
structures 15/5-21/2	clearing;	low to moderate; erosion	short-term; low to moderate; sedimentation; increased turbidity
structure 21/3-23/4	rock; erosion control; access road upgrades	erosion	
structures 23/4-24/3; 24/6-26/7	structure and road construction; clearing	short-term, moderate; increase runoff, erosion; destabilize sensitive areas	short-term moderate; sedimentation, icreased runoff
structures 24/3-24/5	construction and maintenance	erosion	short-term low; increased sediment in Hungry Creek
structure 26/8-27/7	road construction and upgrades, clearing and line construction; rock blasting	high; erosion, destabilize slopes	short-term, moderate; sedimentation; degraded water quality
structures 29/1-29/3	road construction	destablize slopes; slumping; landslides; moderate to high	sedimentation; moderate
structures 30/5-34/7	clearing, structure construction; road improvements	erosion	short-term low to moderate; sedimentation
structure 35/2 to Teton Substation	construction, ford of Lake Creek if needed.	soil compaction; lower soil productivity; erosion	low to moderate; sedimentation in Lake Creek
Teton Substation	construction	low	low; sedimentation in unnamed creek
Switching Station near Targhee Tap	construction, operation, maintenance	increased runoff	low; decreased infiltration; increased runoff

Impacts would be direct, low and short term, resulting in temporary local increases in erosion during and for a short period following construction. Heavy equipment traffic during construction and maintenance could compact soils.

Between structures 3/7 and 4/1 (T2N, R43E, Sec. 14) the proposed line crosses Pine Creek, a perennial tributary to the Snake River. New structures would be built within cultivated dryland grain fields. Impacts would be low. Only trees or other vegetation that could interfere with the line or road construction would be cut on the steep sides of the drainage. Any soil loss would be low compared to losses from neighboring agricultural lands.

For Your Information

This is an area where the USFS and BPA are discussing ways to construct a line without building roads and without blasting rock. As a result BPA and the USFS have proposed three options for routing the line through Pine Creek.

Pine Creek Drainage, Idaho — Between structures 5/2 and 11/3 the project would mostly parallel Pine Creek. Between structures 5/1 and 6/2, at the lower end of Pine Creek Canyon, the line crosses two intermittent tributaries to Pine Creek. Existing access roads are within 30 m (100 feet) of these tributaries and may need improvements. Impacts from access road improvement and structure construction would be low to moderate. Impacts would be primarily short term with soil disturbance possibly contributing to sedimentation within the drainage. Impacts would be greater if storm events occur during construction or before disturbed areas are stabilized.

Pine Creek Routing Option A — This option would avoid the barrier posed by the limestone cliffs and would reduce the risk of destabilizing talus slopes close to Highway 31. This option requires construction of access roads to new structure sites outside the existing ROW between structures 6/1 and 7/1. Slopes are steep, in excess of 50 percent, and access road construction would disturb about 1.5-2.8 hectares (4-7 acres) of earth along an estimated 2500 m (8200 feet) of new access road. The exact amount of disturbance depends on final transmission line and access road design and location. Revegetation of disturbed areas is impaired by rocky, droughty shallow soils. Impacts would be moderate to high and would include increased runoff, erosion, and sediment transported from disturbed sites. Impacts would be the greatest during and immediately following construction, but would decrease in intensity when disturbed areas are revegetated and stabilized. Long-term impacts, which would continue after site restoration, include an increase in runoff and erosion rates relative to present rates.

Pine Creek Routing Option B — From structures 6/2 to 6/9 (T2N, R44E, Sec. 6) the line crosses slopes greater than 55 percent. Limestone rock outcrops, talus, and shallow soils are prominent. No suitable access exists and new access, possibly including full-bench cut roads and end-hauling of excavated material, would be needed. Construction may require blasting. Talus slopes could be destabilized and increase the hazard of

rockfall. The rocky, droughty shallow soils have a moderate erosion potential and a fair to poor revegetation potential. Construction would cause direct impacts including an increase in runoff and erosion and possible destabilizing of slopes. Impacts to soils would range from moderate to high depending on final design and location and the success of mitigation measures. Impacts would be reduced if access roads are not constructed and materials are delivered by helicopter or winched to structure sites. Impacts would be most intense during and shortly after construction, diminishing when erosion controls take effect. However, no prominent drainages are crossed and Idaho Highway 31 is located between Pine Creek and the proposed location, thus reducing the sedimentation risk to Pine Creek. Impacts to water quality would be moderate.

The ROW crosses Pine Creek between structures 6/12 and 7/1. To eliminate impacts at this creek crossing, BPA would exchange existing access for use of a concrete bridge located about 540 m (1800 feet) downstream from the ford currently used. This would eliminate any disturbance caused by possible reconstruction and use of the existing ford for construction and maintenance. The access road does infringe on a wetland next to Pine Creek. Soil stabilization and runoff and sediment controls would be used to minimize the amount of sediment entering the wetland.

Pine Creek Routing Option C — This option would be located on a bench south of Pine Creek with slopes averaging about 15 percent. Impacts would be primarily due to access road and transmission line construction. Roads would be developed both on and off the ROW for this option, and existing roads would be used where practical. Access road construction would disturb about 1 hectare (2-3 acres) of soil. Impacts would be moderate and include increased erosion levels and runoff. The alternative crosses Flume Canyon Creek, an intermittent tributary to Pine Creek. Depending on the structure and access road location, sediment could enter this waterway during storm events. Due to decreased slopes, the absence of terrain barriers (i.e., rock outcrops, shallow soils, and talus-covered slopes), and good to fair revegetation potential, the impacts would be diminished relative to the other alternatives. After construction, impacts would lessen as site restoration and revegetation measures take effect.

New access along the ROW has been constructed recently between structures 7/1 and 8/5. Between 7/4 and 7/8, some small intermittent drainages are crossed. Clearing and disturbance, particularly in wet weather, could cause sediment to reach channels. These short-term increases in sedimentation and stream turbidity could create low to moderate impacts. ROW clearing would increase runoff and peak streamflows slightly.

USFS Road #250 (up Mike Spencer Canyon in T3N, R44E, Sec. 31) would be used to cross Pine Creek and provide access to

structure 8/2. This bridge would be modified or replaced to be suitable for construction traffic. The channel and stream bank would be disturbed during construction and impacts would be moderate and short term. Impacts would include a localized increase in stream turbidity and sedimentation. The bridge would be designed and constructed to prevent any long-term harmful impacts on stream hydraulics, bank erosion, or otherwise degrade the stream's physical characteristics or water quality. Other impacts would result from clearing and structure construction. Revegetation potential is good and the erosion hazard is moderate.

Between structures 8/3 and 8/7, soils are shallow on steep slopes, and there are many rock outcrops. Construction of new access would be needed between structures 8/7 and 8/10. In some areas along this section, the ROW is within 90 m (300 feet) of Pine Creek. Portions of this section may require ripping or blasting bedrock. The density of drainages, clearing requirements, the amount of material disturbed by road construction, and slopes approaching 60 percent in places increase the erosion and sedimentation risk to Pine Creek. If runoff and erosion control measures are used, impacts would be moderate to high, decreasing in intensity as runoff and erosion controls take effect and disturbed areas are stabilized.

An existing ford (T3N, R44E, Sec. 29) across Pine Creek used to access the Poison Creek area (structures 9/1 to 9/4) would be replaced with a temporary or permanent bridge at or near the existing ford location. Disturbance of the banks and streams would be minimal and the stream crossing would be constructed to prevent adversely affecting stream channel characteristics or bank stability. Placement of the bridge abutments would cause short-term temporary increases in stream turbidity. These impacts would be moderate.

Between structures 9/5 and 10/2, new access would be on side slopes approaching 50 percent. Clearing and road construction would create increased runoff and sedimentation, a moderate impact. Erosion would increase slightly above normal until erosion control seeding becomes effective. No tributaries to Pine Creek would be affected and impacts to water quality would be low.

An existing ford across Pine Creek (which provides access to structure 10/7) (T3N, R44E, Sec. 28) would be abandoned.

An existing bridge across Pine Creek (USFS Road #252) (T3N, R44E, Sec. 27), which provides access to Tie Canyon and structures 10/3 to 11/6, would be replaced. Construction would cause temporary localized increases in stream turbidity from bank disturbance, channel modification, and abutment placement. Impacts would be short term and moderate.

An existing road follows the stream bed of Tie Creek. Traffic use and unstable soils in the area have contributed sediment to the creek. Using the road for construction and maintenance would contribute sediment to Tie Creek and adjacent wetlands. BPA would work with the USFS to upgrade the existing road. In addition, BPA would consult with the USFS about using an abandoned bridge site, just west of the existing bridge, to cross Pine Creek and avoid impacts to Tie Creek.

The proposed action parallels a tributary to Tie Creek between structures 12/1 to 12/6. If the line is built on the downslope (south) side of the existing ROW, several new structures would be within 30 m (100 feet) of the tributary. Erosion could carry sediment to the drainage, causing moderate short-term impacts to water quality until revegetation of structure sites takes effect and the soil is stabilized.

Teton River Drainage (Little Pine Creek and Warm Creek), Idaho — From Tie Canyon to Targhee Tap (structures 12/1 to 14/2), the line crosses an area of roughly parallel northwest trending ridges. Southwest slopes are treeless. ROW clearing would be required on northerly exposures. This section has good existing access, but roads on steeper slopes are rutted. Upgrading existing access and installing runoff control structures (e.g., more water bars) would minimize erosion and sediment production. Impacts would be low to moderate.

Between structures 13/5-14/3, several tributaries to Coalmine Fork would be crossed. Some portions of existing access roads in this area are rutted. Ground disturbance from construction and clearing could cause erosion, and sediment could reach these drainages and be transported downstream. Short-term impacts would be moderate. Improving access road drainage and use of ***best management practices*** would reduce impacts.

For Your Information

Best management practices *are a practice or combination of practices that are the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.*

The existing Coalmine Fork crossing near structure 14/2 is a culvert. If the crossing needs to be upgraded, impacts would be moderate, localized short-term increases in stream turbidity.

Between structures 14/6 and 15/4, existing access roads use fords to cross Little Pine, Wood Canyon, and Murphy creeks. The Little Pine Creek and Murphy Creek fords would be replaced with culverts causing a slight short-term temporary increase in stream turbidity during installation. The Wood Canyon Creek ford would not be used. Clearing requirements to widen the ROW in this section and eastward to Targhee Tap would cause localized increases in runoff, which could increase erosion. Sediment could reach Murphy and Wood Canyon creeks and several intermittent drainages. A spring flows across the existing access road near structure 16/4. A culvert would be sized and designed to adequately carry this water. Culvert installation would result in a temporary increase in turbidity and sediment transport until soil stabilization measures take effect. Impacts would be low.

Existing roads provide access from Targhee Tap to the Trail Creek crossing (18/4 to 21/2). ROW clearing would increase the risk of sediment entering tributary drainages to Warm Creek. Impacts would be low to moderate and short term with use of best management practices to control erosion and runoff. Long-term impacts include an increase in localized erosion and runoff rates relative to preconstruction values.

Teton River Drainage (Trail Creek), Idaho — The existing access from Pole Creek to structure 23/4 is susceptible to rutting and would require rock and runoff controls. Impacts would be low to moderate. No impacts from construction or maintenance are expected at the Trail Creek crossing (structures 21/2 to 21/3) (T3N, R46E, Sec. 30) where an existing bridge would be used.

Where the line would follow Trail Creek up the west side of Teton Pass, about 5 km (3 miles) of new access roads between structures 23/5 to 24/3 and 24/6 to 26/7 would be built. Several potentially unstable areas including debris flows, rock slides, and avalanche chutes occur in these sections. Road construction, clearing, and erecting structures would increase runoff and erosion and could destabilize sensitive areas. The likelihood of sediment moving off-site would increase. Road and structure design and location would cause potential impacts that could result in adverse effects to water quality and the integrity of the transmission lines and access roads. With implementation of best management practices to control runoff and erosion, impacts would be moderate. Impacts would be greatest during and immediately following construction. As stabilization and erosion control measures become effective, impact intensity would decrease. Although remaining higher than preconstruction values, in the 1-2 years following construction, erosion and runoff rates would decrease and stabilize.

Access does exist within the Hungry Creek drainage between structures 24/3 and 24/5. The existing road fords Hungry Creek several times. Construction and maintenance activities would cause short-term minor increases in sediment within Hungry Creek.

Current access between structures 26/8 and 27/7 is inadequate. New access approaching structure sites from upslope is needed. Roads would be constructed in steep drainages to reach structure sites. Road and line construction would require ripping or blasting bedrock. The area is subject to slumps and avalanches. Slopes are steep, exceeding 65 percent in places and the disturbance would cause sediment to reach a nearby unnamed creek 38-61 m (125-200 feet) away. Water from a drainage between structures 27/3 and 27/4 currently flows across the road. Modification of road drainage would also cause temporary degradation of water quality until runoff and stabilization

measures take effect. Impacts from line and road improvements in this area would be moderate to water resources, but impacts would be high to soils. Impacts would decrease with time as runoff and erosion controls take effect and disturbed areas are stabilized. Road and structure locations would attempt to minimize disturbance and prevent adverse long-term site stability impacts.

Trail Creek Drainage, Wyoming — On the east side of Teton Pass the line crosses marginally stable terrain (U.S. Department of Agriculture, Soil Conservation Service, July 11, 1985). Between structures 29/1 to 29/3, road construction could destabilize slopes and initiate slumping and landslides which could contribute increased sediment loads into the Trail Creek drainage. Detailed, on-site evaluation of road and structure locations would be needed to avoid or mitigate construction activities on unstable areas. Impacts to soil and water resources would be moderate to high and moderate, respectively.

Phillips Ridge, Wyoming — Existing access roads along Phillips Ridge would be used from structures 29/4 to 34/7. From structures 30/5 to 34/7, the line follows Phillips Ridge. Impacts along this portion of the line would be primarily from clearing, structure construction, and access road improvements. Impacts would include increased runoff with a subsequent increase in erosion and off-site movement of sediment. The line and access follows the ridge line and impacts on waterways would be minimal. Any impacts to water quality would be low. Impacts would increase to moderate if the access road from Phillips Canyon is used. Major reconstruction of the road is required for it to be usable.

Fish Creek Drainage, Wyoming — From structure 35/6 to Teton Substation the project crosses irrigated pasture. Construction traffic could cause soil compaction and rutting if soils are crossed when wet. Impacts would result in lower soil productivity. Fish and Lake creeks are crossed between structures 35/5-35/6 and 35/8-35/9 (T41N, R117W, Sec. 2), respectively. Construction and use of a ford or temporary bridge to cross Lake Creek would disturb the streambank and channel. Impacts would be moderate and short term and include a localized increase in stream turbidity and sedimentation. The risk that sediment disturbed during structure construction would reach the creeks is low due to the level terrain and distance separating the construction sites and creeks.

Construction within Teton Substation could allow sediment to enter a nearby unnamed creek. Use of standard erosion control practices during construction would keep impacts low.

Underground Line Termination Option at Teton Substation- Impacts would be primarily related to excavation activities to put the line underground from structure 36/4 to the line's end. About 4893-6116 m^3 (6400-8000 yds^3) of soil material (mostly within the existing substation) would be disturbed by the trench. The site is

level and the risk of runoff and erosion is slight. The risk of off-site transport of sediment would be greatest during excavation and construction when soil is exposed. Use of sediment barriers would minimize the risk of sediment being transported off-site and entering the ditch on the west side of the substation parking area. If it is necessary to pump groundwater from the excavation during construction, water would not be discharged directly into live streams. Although the amount of ground disturbance would be greater for this option, impacts to soil and water resources would be low. Construction of this alternative would primarily affect non-vegetated surfaces within the substation property boundaries. Following site restoration, long-term erosion and runoff levels would be similar to preconstruction levels.

4.5.2.2 Recommended Mitigation

Standard mitigation would use the measures best suited to each individual location to reduce erosion and runoff, and stabilize disturbed areas during and after construction (e.g., using erosion control blankets to stabilize cut and fill slopes from construction. The following measures used alone or in combination would minimize soil disturbance and the effects of increased erosion and surface runoff created by access road improvements and transmission line construction:

- Properly space and size culverts, use ***crossdrains***, ***water bars***, rolling the grade, and armoring of ditches and drain inlets and outlets.
- Existing vegetation would be preserved where possible, and disturbed portions of the site stabilized. Stabilization measures would be started where construction activities have temporarily or permanently ceased, as soon as practicable.
- Promptly seed disturbed sites with an herbaceous seed mixture suited to the site.
- Use vegetative buffers and sediment barriers to prevent sediment from moving off-site and into water bodies.
- Assist farm operators with ***subsoiling*** to restore soil productivity.
- Design and construct all fords and bridges to minimize bank erosion. Specific locations and measures would be determined when road and line design are finalized.
- Schedule operations during periods when precipitation and runoff possibilities are at a minimum to reduce the risk of erosion, sedimentation, and soil compaction.

For Your Information

Compaction affects soil productivity, reduces infiltration capacity, and increases runoff and erosion. ***Subsoiling****, normal farming, cultivation and cropping, and freeze-thaw cycles restore soils to their preconstruction condition.*

Subsoiling *is plowing or turning up the layer of soil beneath the topsoil.*

- Design facilities to meet regional seismic criteria.
- Use double-circuit and/or helicopter construction (if feasible) to reduce impacts to moderate on Teton Pass (structures 26/7 to 29/3).
- Site structures outside of known avalanche chutes or unstable areas to preserve transmission line integrity and slope stability.
- Consider full-bench road construction and end hauling excess sidecast material on slopes exceeding 55 percent if needed to stabilize the roadbed. Prior to construction, suitable waste areas would be located where excess materials could be deposited and stabilized.
- Avoid riparian areas, drainage ways, and other water bodies. Where theses areas cannot be avoided, apply sediment reduction practices to prevent degradation of riparian or stream quality.
- Avoid or mitigate water quality and fish habitat degradation. Design and maintain roads so that drainage from the road surface does not directly enter live streams, ponds, lakes, or impoundments. Direct water off roads into vegetation buffer strips or control through other sediment-reduction practices. Restrict road construction to areas physically suitable based on watershed resource characteristics. Design stream crossings to avoid adverse impacts to stream hydraulics and deterioration of stream bank and bed characteristics.
- Avoid discharge of solid materials, including building materials, into waters of the United States unless authorized by a Section 404 permit of the Clean Water Act. Off-site tracking of sediment and the generation of dust shall be minimized. Vegetative buffers would be left along stream courses to minimize erosion and bank instability.
- Prepare a stormwater pollution prevention plan (as required under the National Pollution Discharge Elimination System General Permit).
- Set crossing structures as far back from stream banks as possible near any water body. Avoid refueling and/or mixing hazardous materials where accidental spills could enter surface or groundwater.
- Avoid adverse impacts to water quality by using only herbicide treatments approved by the Wyoming Department of Environmental Quality and included in Idaho's Best Management Practices.

- Design the project to comply with local ordinances and laws and state and federal water quality programs to prevent degradation of the quality of aquifers and not jeopardize their usability as a drinking water source.

For measures required for stormwater regulations see Section 5.16, **Discharge Permits under the Clean Water Act**.

4.5.2.3 Cumulative Impacts

Current and future forest and agricultural management practices in the watersheds crossed might increase peak flows and introduce sediment into streams. Increased sediment in streams is expected from construction of the line alternatives in addition to agricultural and forest management activities. The volume of peak flow and the amount of sediment entering streams would depend on site-specific conditions. Mitigation measures proposed for construction of the line and those required by the USFS for logging-related activities would help reduce the chance of large amounts of sediment entering streams. The line alternatives would be constructed to prevent interfering with ongoing farm conservation efforts to control erosion and maintain water quality. Although minor, localized increases in erosion, runoff, and sedimentation are expected from construction and maintenance, these increases would have a low impact on the area's soil resources and water quality and would not impair the current beneficial use of any water body.

4.5.3 Single-Circuit Line Alternative

4.5.3.1 Impacts

Impacts to water and soils would be the same as the Agency Proposed Action except in the Teton Pass area (structures 28/1-29/3), and coming off Phillips Ridge (structures 34/6 and 35/1). In these areas, the line would not be double circuit as in the Agency Proposed Action. Although similar in intensity and duration, soil and water resource impacts would increase relative to the Agency Proposed Action due to greater disturbance from increased clearing and access requirements for the single-circuit line.

4.5.3.2 Recommended Mitigation

- Refer to measures under Agency Proposed Action, Section 4.5.2.2.

4.5.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.5.2.3).

4.5.4 Short Line Alternative

4.5.4.1 Impacts

Impacts from transmission line construction and maintenance would be the same as for the Targhee Tap to Teton Substation portion of the Single-Circuit Line Alternative. Additional impacts would be from construction of the switching station near Targhee Tap. The switching station could be placed in pasture north of structures 18/3 and 18/4 near the mouth of Pole Canyon. The erosion hazard is low. The potential long-term impacts of the switching station construction, operation, and maintenance would be low. Localized increases in runoff would occur from decreased infiltration at the site from the switching station's impervious surface. BPA would develop and implement a Stormwater Pollution Prevention Plan.

4.5.4.2 Recommended Mitigation

- Mitigation for the transmission portion of the project would be the same as for the Single-Circuit Line Alternative (see Section 4.5.3.2).
- Standard erosion and runoff control practices would be used during construction of the switching station. The specific location and type of measures would be determined when the facility location and design are finalized.

4.5.4.3 Cumulative Impacts

Cumulative impacts would be the same as the Single-Circuit Line Alternative (see Section 4.5.3.3).

4.5.5 SVC Alternative

Both the Teton Substation site and the site at Jackson Substation are nearly flat and there is minimal erosion hazard. Construction impacts related to soil disturbance and possible impacts on water resources would be low. At Teton Substation, preventive measures would be used to stop sediment from moving off-site into nearby waterways. At Jackson Substation, heavy equipment traffic along

the existing road between the substation and Flat Creek could disrupt the road surface and allow sediment to be moved off-site. If necessary, sediment barriers would be used to prevent sediment from entering Flat Creek.

4.5.6 No Action Alternative

There would be no additional impacts to soils, geology or water quality.

For Your Information

Floodplains are areas periodically inundated with water near lakes and rivers. They provide wildlife habitat, agricultural and forest products, and recreation areas and a channel for flood waters. Protection of floodplains is necessary to prevent damage to these functions and to protect human and natural features within them. Executive Order 11988 (Floodplain Management) requires federal agencies to avoid or minimize adverse impacts associated with modification and occupancy of floodplains.

Wetlands provide a harbor for specially-adapted plants and animals, and benefit water quantity and quality. Wetlands are protected by federal legislation (Executive Order 11990) which discourages development in wetlands whenever there is a practicable alternative. (See Section 5.8.)

Wetlands were identified using USFWS National Wetland Inventory maps, black and white aerial photographs, and field studies. Because of a lack of access to some areas, the whole ROW has not been field checked. Therefore, impacts are discussed for wetlands identified using available resources. When more information is available about structure locations, a more thorough field check would determine whether these are jurisdictional wetlands and if they would be affected.

4.6 Floodplains and Wetlands

To comply with federal regulations (Compliance with Floodplain/Wetlands Environmental Review Requirements [10 CFR 1022.12]), BPA has prepared an assessment of the impacts of the Agency Proposed Action and alternatives (see Section 5.8, **Floodplain/Wetlands Assessment**). A notice of floodplain and wetlands involvement for this project was published in the Federal Register on November 6, 1996. See Section 3.7, **Floodplains and Wetlands** and Map 6 for floodplain locations.

4.6.1 Impact Levels

4.6.1.1 Floodplains

A floodplain impact would be expected when structures or permanent access roads encroach on designated floodplains and increase the potential for flooding; or might cause loss of human life, personal property, or natural resources within the floodplain.

No impacts are expected where floodplains are avoided, spanned, or standard mitigation would effectively eliminate impacts.

4.6.1.2 Wetlands

Transmission line construction could affect wetland functions by altering aesthetics; clearing tall-growing wetland vegetation such as willows or cottonwoods; reducing the ability of a wetland to provide for flood and sediment control; and altering wildlife habitat and patterns of use. Access road construction could modify wetland surface and groundwater flow patterns, and in some cases, reduce the wetland's ability to provide flood control. Road improvements could increase sediment transport, destroy vegetation and wildlife habitat, and change recreation use patterns and aesthetics. Wetlands can also be indirectly affected when

wetland soil structure is changed by compaction or rutting, which in turn could change the productivity, water infiltration rates and flow patterns.

A **high** impact would occur:

- if wetland hydrology, vegetation, and/or soils, are extensively or permanently altered by excavation or fill, and the ecological integrity of a wetland is profoundly impaired;
- there is complete loss of a wetland or a wetland function is destroyed.

A **moderate** impact would occur:

- if wetland hydrology, vegetation or wet soils are altered by excavation or fill, but the change is seasonal and the ecological integrity is not profoundly impaired. Recovery generally requires restoration and monitoring;
- if there is a partial loss of a wetland or a wetland function is disturbed.

A **low** impact would occur:

- if vegetation or soils are changed for the short term, but hydrology is unchanged. Recovery is usually independent;
- if there is a short-term disruption of a wetland function.

No impact occurs if wetlands are avoided and would not be affected by new or rebuilt access roads or construction, operation and maintenance of facilities. The size, quality and functions of existing wetlands are not reduced.

4.6.2 Agency Proposed Action

4.6.2.1 Floodplain Impacts

Reminder

Map 6 shows Floodplains and Wetlands.

The existing corridor crosses four creeks, Pine Creek and Trail Creek in Idaho, and Fish Creek and Lake Creek in Wyoming, that are identified as 100-year floodplains. New transmission line structures would not be located in 100-year floodplains, however, impacts would occur from reconstruction of existing access roads and construction of new access roads within the floodplain.

Specific Areas Along the ROW — There would be no impacts to the floodplains of Fish Creek because the floodplain is spanned and there is no through access across the creek. Impacts would not occur to the floodplains of Trail Creek (Idaho, T3N, R46E, Sec. 30) because the existing bridge is adequate to handle heavy loads for construction of the line.

Pine Creek Routing Option A-C — These options would not impact the floodplain on the south side of the highway because the floodplain would be spanned. The existing bridge that crosses Pine Creek is adequate for BPA use during construction. New access roads may be needed but would be located out of the floodplain.

USFS Roads #250 (T3N, R44E, Sec. 31) and #252 (T3N, R44E, Sec. 27) currently cross the Pine Creek floodplain with bridges. The bridges, which are sufficient for maintenance vehicles, would be inadequate for heavy construction loads and would need to be replaced with either a temporary or permanent bridge. A temporary bridge has permanent abutments with a bridge placed on the abutments when use is necessary.

Reminder

Map 2 shows structure numbers and locations.

USFS Road #250 is used to access structure 8/2 up Mike Spencer Canyon. Road #252 is used to access structures 10/3-11/6. A new bridge on this road would be relocated and efforts would be coordinated with the USFS. Long-term impacts would occur to floodplains where permanent abutments are placed. Abutments and access roads placed within the floodplain would be designed so they do not impede the flow of floodwaters or cause erosion of streambanks. Areas immediately adjacent to the abutments and road could receive short-term impacts. Vegetation damaged by construction of the abutments would recover within a season or two.

A ford crossing Pine Creek (T3N, R44E, Sec. 29) was used by BPA to access structures 9/1-9/4, but it has since washed out. For construction and maintenance, a temporary or permanent bridge could be built in place of the ford. A temporary bridge would have permanent abutments, with the bridge placed on the abutments only during construction, or for emergency line maintenance. Installing abutments would disturb soil and vegetation. Impacts would be similar to those described above.

Another ford crosses Pine Creek in T3N, R44E, Sec. 28 and is used to access structure 10/7. This ford has been washed out and would not be replaced.

Access would be needed to a section of existing ROW near structures 35/5-35/8 (T41N, R117W, Sec. 2) located between the Fish Creek and Lake Creek floodplains. Access to these structures would have to be constructed across Lake Creek. A temporary or permanent bridge would be constructed; impacts would be similar to those described previously.

There would be no impacts to 100-year floodplains from line termination equipment at substations. Swan Valley and Teton substations are not in the 100-year floodplain or in Zone X. Additional equipment would be placed within the existing fenced yard.

Zone X areas are areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from a 100-year flood.

Underground Line Termination Option at Teton Substation - No additional impacts to floodplains would occur.

Operation and Maintenance — With bridges in place, operation and maintenance of the line should not cause further impacts to 100-year floodplains. If vegetation grows back on access roads leading to the bridges, it could be crushed by vehicles when roads are used. However, because use is sporadic, vegetation would recover quickly.

4.6.2.2 Wetlands Impacts

Riparian associated wetlands and wet meadows occur along the existing ROW. All wetlands would be spanned by the conductor and new structures would be located in upland areas. Direct impacts would occur where existing access roads cross wetlands and indirect impacts could occur from construction and maintenance vehicles. Stormwater runoff could cause sedimentation in wetlands, but erosion control devices should reduce or eliminate impacts.

Specific Areas Along the ROW — An access road runs parallel to Pine Creek and along the fringe of the wetlands by the old Pine Creek Lodge.

Pine Creek Routing Option A-C — These options would have no to low impacts on wetlands because riparian wetlands associated with Pine Creek would be spanned and an existing bridge would be used for access. Any new access road or access road improvements on the south side of the highway could carry sediment into the nearby wetland, affecting water quality and biological productivity. Use of erosion control devices would ensure that these indirect impacts are kept to a minimum. Impacts would be low.

After the ROW crosses Pine Creek, it climbs uphill and runs parallel to the creek. Between structures 7/4-7/8, it crosses several draws that carry surface runoff into Pine Creek. Use of erosion control devices would ensure sediment does not reach the creek; impacts would be low and short term.

USFS Road #250 (T3N, R44E, Sec. 31) crosses Pine Creek up Mike Spencer Canyon with an existing wood bridge accessing structure 8/2. The bridge would be inadequate for heavy construction loads and would need to be replaced. A small area equivalent to the bridge abutments and road approach would be permanently removed and occupied. Soil erosion may increase, and sedimentation could occur during excavation for the abutments and road grading. Impacts would be moderate. If vehicles working around Pine Creek, and off access roads use mats, and erosion control devices are used, impacts would be reduced.

A scrub/shrub wetland at a ford crossing Pine Creek (T3N, R44E, Sec. 29 and accesses structures 9/1-9/4) is dominated by willow thickets. Since the ford has washed out and the road has not been used, much vegetation has grown back. Wetland vegetation (willows and grasses) would be removed during road improvements and construction of a bridge. Precast concrete would be placed in the wetland for permanent abutments. Soils would be disturbed temporarily and some wetland vegetation removed permanently. Impacts would be moderate.

There is no access to structures 9/5 to 10/2. New roads would be needed for project construction. The roads would be upslope from Pine Creek and erosion control devices could be used during construction to prevent sediment from reaching Pine Creek wetlands. Impacts would be low if erosion control devices are used and short term.

USFS Road #252 crosses Pine Creek in T3N, R44E, Sec. 27, and would be used to access structures 10/3-11/6. The existing bridge would have to be replaced. Alternative sites for a new bridge would be coordinated with the USFS. Construction of a new bridge would create moderate impacts to wetland vegetation and soils. Mitigation measures (see Section 4.6.2.3, **Recommended Mitigation**) would help reduce impacts.

Near structures 24/3 and 24/4, around Hungry Creek in T3N, R46E, (no section), BPA's access road crosses a wet meadow fed by springs. The meadow supports a variety of forbs such as stinging nettles, sedges and cow parsnip. The existing road is in poor condition and would need to be graded and rocked so it could accommodate construction vehicles. Impacts would be moderate in the area disturbed by access road improvements, which could increase sediment transport and destroy vegetation.

Access would be needed to a section of existing ROW near structures 35/5-35/8 (T41N, R117W, Sec. 2) between the Fish Creek and Lake Creek floodplain. Construction of a temporary bridge would require concrete abutments on either bank, with the bridge in place only during construction or for emergency line maintenance. The placement of abutments could cause long-term, moderate impacts to wetlands.

The wetlands associated with Fish Creek and Lake Creek near structures 35/5-35/8 have emergent vegetation such as sedges, rushes and grasses. Surrounding pastures are flood irrigated and tend to pond in depressions that are poorly drained. A temporary road would be located to avoid or minimize impacting nearby wetlands. Impacts would be low and short term.

Substations — There would be no impacts to wetlands because new equipment at Teton Substation would be placed within the existing yard, therefore none of the adjacent wetlands would be impacted. There are no wetlands at Swan Valley Substation.

Underground Line Termination Option at Teton Substation - No additional impacts to wetlands would occur because the area that would be disturbed is gravelled.

Operation and Maintenance — Maintenance activities have the potential to impact wetlands. Sedimentation can reach wetlands from stormwater runoff of access roads improperly maintained. Existing roads should be upgraded to prevent this. If roads are upgraded, impacts would be low.

4.6.2.3 Recommended Mitigation

Standard mitigation measures would effectively keep impacts to a minimum:

- Locate structures and any new roads to avoid floodplains;
- Minimize vegetation removal at fords and new bridge construction sites;
- Revegetate entrance and exit to fords with native riparian vegetation immediately after construction to reduce loss of soil within floodplain;
- Remove debris from construction and clearing;
- Design fords and bridges to be flood-proof;
- Limit movement of equipment across fords whenever possible.
- Locate access roads to avoid wetlands;
- Span wetlands and place structures in upland;
- Minimize vegetation removal at wetland crossings;
- Identify and flag wetlands before construction;
- Use erosion control measures when conducting any earth disturbing work uphill from a wetland;
- Save topsoil in wetlands when excavating for placement of abutments. Redeposit soil in place after bridge construction;
- Refuel equipment in designated areas away from water resources;
- Coordinate activities among BPA, and regulatory agencies to ensure compliance with wetland and floodplain regulations.

Where adverse impacts could not be avoided, mitigation would be determined, if necessary, with appropriate jurisdictional agencies.

4.6.2.4 Cumulative Impacts

Building new bridges and improving access roads in floodplains would result in incremental impacts to floodplains as more of the floodplain is developed.

Wetlands over time have had incremental losses and degradation which have seriously depleted wetland resources. Cumulative impacts would result from line construction and maintenance, however impacts would be low. The disturbance from maintenance vehicles would be reduced by the use of permanent or temporary bridges (instead of fords) where wetlands are crossed. Maintenance vehicles using access roads upslope of wetlands could produce minor amounts of sediment that would temporarily impair wetland functions. Installation of permanent abutments in riparian wetlands would reduce the total size of these wetlands by a minor amount.

4.6.3 Single-Circuit Line Alternative

4.6.3.1 Impacts

Impacts to floodplains and wetlands would be the same as the Agency Proposed Action.

4.6.3.2 Recommended Mitigation

- Refer to measures under Agency Proposed Action, Section 4.6.2.3.

4.6.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.6.2.4).

4.6.4 Short Line Alternative

Impacts to wetlands from this alternative would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

A new switching station would be built near Targhee Tap. The switching station would not be located in a floodplain or wetland, nor would any of the access roads, therefore, there would be no impacts to floodplains or wetlands.

No additional mitigation is required and no cumulative impacts are expected.

4.6.5 SVC Alternative

There would be no impacts from this alternative to floodplains or wetlands.

No mitigation is required and no cumulative impacts are expected.

4.6.6 No Action Alternative

Current levels of impacts would continue under this alternative.

For Your Information

Vegetation resources can be adversely affected by construction, operation and maintenance of transmission facilities. Short-term impacts occur only during construction and usually have minimal lasting impacts on vegetation. Other impacts are long term, such as ongoing maintenance practices that can permanently alter plant species composition and communities.

4.7 Vegetation

4.7.1 Impact Levels

A **high** impact would be expected where:

- Native plants and their ecological communities are permanently removed (i.e., topsoil and the root system of the plant are removed), or noxious weeds are spread due to construction or maintenance.

Moderate impacts would be expected where:

- Native plants and their ecological communities are temporarily disturbed, the soil is compacted, but the topsoil and the root system remain intact.

Low impacts would be expected where:

- Native plants and their ecological communities are disturbed without displacing the root system or compacting soils.

4.7.2 Agency Proposed Action

4.7.2.1 Impacts

Construction — Construction of the new line (single-circuit structures) would require an additional 23 m (75 feet) of new ROW. Clearing would include trees that interfere with the construction and operation of the line both in the ROW and outside. About 73 hectares (181 acres) of mixed conifer trees would be cleared. This amount does not include those trees off ROW that are selectively cleared because they could fall into the line and hinder operation. Impacts to vegetation from clearing would be moderate because root systems would be left intact, and

the topsoil would not be removed. Also, the amount and type of vegetation cleared is relatively small compared to the amount of the same type of vegetation in the area. At the first Pine Creek crossing (structures 3/7-4/1), trees in a riparian zone would need to be cleared. Riparian vegetation serves an important resource function as wildlife habitat, therefore impacts would be moderate. In forested areas, there is an understory of shrubs and grasses and forbs, and maintaining this layer would help mitigate impacts. Clearing trees would open up the canopy, changing the habitat to a shrub/grass/forb community within the new ROW.

An area of 334 m^2 (3600 ft^2) is typically disturbed around an average lattice steel structure. Within this area, about 21 m^2 (225 ft^2) of vegetation would be permanently removed and the topsoil disturbed, which would have high impacts to vegetation. Moderate impacts would occur to vegetation that is crushed by vehicular traffic, however without root disturbance it should recover within a season depending on soil compaction. South facing slopes, shallow or unstable and excessively rocky soils would be more difficult to revegetate. Overall impacts to vegetation from structure construction would be moderate because the type of vegetation that would be removed is abundant in the area.

Pine Creek Routing Option A — About 5.3 hectares (13 acres) of vegetation would be cleared for this option. Overall impacts would remain moderate. In areas where roads would be built, impacts would be high because vegetation would be permanently removed.

Pine Creek Routing Option B — About 2.8 hectares (7 acres) would be cleared for this option. Impacts would be moderate.

Pine Creek Routing Option C — About 3.2 hectares (8 acres) would be cleared for this option. Where vegetation is permanently removed (i.e., roots taken out), impacts would be high. Overall impacts to vegetation would be moderate.

Underground Line Termination Option at Teton Substation - No additional impacts to vegetation would occur because the existing area is gravelled.

Reminder

Most existing access roads would need improvements, which would include grading the roads to 4 m (14 feet) wide, 5-6 m (18-20 feet) wide at the curves. About 6-8 km (4-5 miles) of new access roads are also needed to have a complete access road system in place. Clearing and construction activities for new access would disturb an additional 3 m (10 feet) on either side of the road.

Access Roads — The existing road system does not access every structure. These areas are not accessible by road:

- From structure 6/2 to 6/9
- From structure 8/7 to 8/10
- From structure 9/5 to 10/2
- From structure 23/5 to 24/3
- From structure 24/6 to 26/7
- From structure 29/1 to 29/3

Approximately 8-16 km (5-10 miles) of new roads (not including spur roads) would be located within the ROW whenever possible to avoid additional vegetation removal. Impacts from construction of permanent roads would be high to vegetation because the vegetation and topsoil would be permanently removed. These roads would either be dirt or gravel. Overall impacts to vegetation from road construction would be moderate because existing plant communities are relatively abundant and are not likely to be substantially affected. Roads that cannot remain inside the ROW due to topographic constraints would be located to minimize vegetation removal. Where slopes are steep and face south, soils are drier and revegetation is more difficult.

Impacts to riparian vegetation along Pine Creek, Trail Creek and Lake Creek would occur from road crossings. USFS Road #250 and USFS Road #252 cross Pine Creek and have existing bridges that would either need to be reinforced or replaced to be adequate for construction loads. (See Section 4.6, **Floodplains and Wetlands**.) This could have moderate to high impacts on riparian vegetation depending on how much vegetation would need to be permanently removed. A ford used to cross Pine Creek to access structures 9/1-9/4 has washed out and would not be replaced. A bridge would be built across Pine Creek instead. Building a bridge would require placement of abutments into the banks and removing small amounts of riparian vegetation. Construction activities could crush or uproot plants. Impacts would be moderate to high.

Operations and Maintenance — Within the corridor, vegetation would be periodically cleared and kept low-growing to allow access to transmission facilities and prevent hazards to the line. Tall-growing brush and trees that could interfere with lines would be removed. Continued use of access roads could cause indirect impacts such as soil compaction and dust. Soil compaction damages root systems, and dust clogs leaf surfaces. Often access roads can become roads for off-road vehicles that can cause additional and ongoing destruction of plant habitat. Overall, maintenance-related impacts could be low to moderate, and would continue for the life of the line. In areas where soils are disturbed by maintenance activities, noxious weeds could invade causing high impacts to vegetation.

Noxious Weeds — Noxious weeds are plant species designated as noxious weeds by federal or state law. In Wyoming and Idaho, noxious weeds are listed on a Designated List. Disturbed areas such as transmission corridors often become infested with undesirable or non-native plants species. These species take advantage of disturbed soils and the lack of competing vegetation in areas recently cleared. Construction would disrupt vegetation and disturb soils, encouraging invasion of noxious weeds. Vehicles can transport weed seeds from infested areas to locations along the

ROW and access roads. For specific measures that BPA would take to lessen the spread or introduction of non-native plant species during construction see Section 4.7.2.2, **Recommended Mitigation**.

A preconstruction weed inventory would be conducted this summer (1997) to document existing weed infestations. The inventory would provide baseline data to establish the need for and/or to develop a weed control plan. A post-construction weed inventory would be conducted the second year after construction to determine if noxious weeds had invaded disturbed areas. BPA would assist and cooperate with the USFS, landowners, and local weed control boards to control noxious weeds along the ROW.

Threatened and Endangered Species — *Spiranthes diluvialis* (Ute lady's tresses), recently discovered in Idaho, was federally-listed as threatened in January 1992 (see Section 3.8.5, **Special Status Plants**). The species may be adversely affected by modification of riparian and wetland habitats that can be associated with construction or any actions that alter hydrology.

The USFS has a list of sensitive plant species, subspecies, or variety for which the Regional Forester has determined that there is a concern (see Section 3.8.5, **Special Status Plants** for a complete listing). A plant survey will be conducted this summer (1997) to determine if any populations of state-listed, federally-listed or forest-sensitive plants exist in the project area.

4.7.2.2 Recommended Mitigation

The following mitigation measures would minimize impacts to vegetation. Site-specific mitigation action plans would be developed with the USFS before construction starts.

- Locate proposed project adjacent to existing corridor to keep clearing to a minimum.
- Use existing access road system with minimal development of new roads.
- Keep additional vegetation clearing to the minimum needed to maintain safety and operational standards.
- Ensure that adequate topsoil depth and texture are in place. Promptly reseed or revegetate disturbed areas with native seed mix as soon as construction in an area is completed.
- Apply appropriate fertilizers to favor perennial mixes as opposed to weedy annual species.
- Limit construction activities during wet periods to minimize damage to plants.

- All reclamation plans would consist of native plant seed mixes approved by the USFS.
- Seed mix composition, rates and reclamation plans would be approved by the USFS.
- Any disturbed areas would require a minimum of 10.2 cm (4 inches) of native topsoils.
- Mulches would be approved by the USFS.

Control measures for noxious weed species:

- Conduct preconstruction weed survey to document existing weed populations.
- Wash all earthmoving equipment at established wash stations prior to entry into project area.
- If earthmoving equipment has been operating in an area heavily infested with noxious weeds, wash equipment before moving into another area.
- Ensure that earth materials (such as gravel, fill, etc.) brought in from other sites are free of noxious weed seed.
- Apply tested seed, clean of noxious and restricted weed seeds.
- Use weed-free mulch.

4.7.2.3 Cumulative Impacts

Plant species and natural communities are interdependent parts of a complex system of soil, water, human and animal life, and many other biological resources. The system is weakened when plant communities become fragmented or when important native habitats are invaded by non-native weeds. The new corridor would be placed next to an existing corridor that has plant communities that have already been disturbed. The new transmission facilities would remove some plants from the plant community and noxious weeds could invade the area. This could have a high impact to vegetation.

4.7.3 Single-Circuit Line Alternative

Overall impacts would be similar to the Agency Proposed Action. Areas where a double-circuit line would be used in the Agency Proposed Action would require less clearing and disturbance of existing vegetation than the Single-Circuit Line Alternative. Total amount cleared would be about closer to 72 hectares (178 acres). Structure height and slope would determine how many additional trees in danger of falling into the line would be removed outside the ROW.

4.7.3.1 Recommended Mitigation

- Refer to measures under Agency Proposed Action, Section 4.7.2.2.

4.7.3.2 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.7.2.3).

4.7.4 Short Line Alternative Impacts

Impacts would be similar to the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation. About 38 hectares (95 acres) of mixed conifers would need to be cleared, about half the amount of the Agency Proposed Action and the Single-Circuit Line Alternative.

A new switching station would be constructed near Targhee Tap. The station would permanently remove about 0.4 hectare (1 acre) of pasture. A permanent road would be needed to access the substation. The road would be about 4 m (14 feet) wide and gravelled.

4.7.4.1 Recommended Mitigation

- Mitigation would be the same as under the Single-Circuit Line Alternative.
- Locate switching station in a cleared area to avoid removing trees.

4.7.4.2 Cumulative Impacts

Impacts would be the same as the Single-Circuit Line Alternative.

4.7.5 SVC Alternative

4.7.5.1 Impacts

At Teton Substation, the expansion could occur into an existing parking lot on the northwest side of the substation. A riparian wetland is present on the north and east sides of the substation. The existing parking lot is bordered by a ditch which carries

irrigation water and surface runoff from a nearby field. Moving the fence line would remove little vegetation since the surface is currently gravelled. Overall impacts to vegetation from substation expansions would be low.

At Jackson Substation there would be no to low impacts from expanding the substation to the north and removing 13.5 m^2 (150 ft^2) of vegetation that has been previously disturbed.

4.7.5.2 Recommended Mitigation

Mitigation measures would be the same as those for the Agency Proposed Action.

4.7.5.3 Cumulative Impacts

There would be no cumulative impacts to vegetation.

4.7.6 No Action Alternative

There would be no impacts to vegetation, but there would still be continued impacts from operation and maintenance of the existing transmission line.

4.8 Wildlife

4.8.1 Impact Levels

High impacts on wildlife occur when an action would create a significant adverse change in present wildlife populations, individuals, or habitats. Significant adverse changes include impacts that:

- create an unavoidable adverse effect on a federally-listed threatened or endangered animal species;
- significantly reduce the quantity or quality of a regionally or nationally significant wildlife population or habitat area;
- significantly reduce the quantity or quality of habitat critical for the survival of local populations, such as big-game winter range; or
- adversely affect rare or declining species or other species with high public profiles, values, or appeal (e.g., sandhill crane, deer, and elk) at the regional level. For this project, the regional level is considered the Greater Yellowstone Ecosystem.

Moderate impacts on wildlife occur if the impacts:

- create an effect on threatened or endangered species that could be mitigated partially through interagency consultation with the USFWS under Section 7 of the Endangered Species Act;
- cause a local reduction in the quantity or quality of wildlife habitats (as opposed to regional reductions); or
- marginally reduce the productivity of adjacent wildlife habitats or resources (such as nest sites).

Low impacts occur when an action creates an impact that would:

- create an effect that could be largely mitigated;
- reduce the quantity or quality of wildlife habitat or species confined to the site of the action;
- cause no significant effect on productivity of adjacent wildlife habitat;
- temporarily disturb common wildlife species;
- reduce habitat that is very common in the project vicinity;
- adversely affect relatively common species at a local level (i.e., occurring within the immediate vicinity of the project and not affecting regional populations); or
- cause temporary effects or those that can be minimized by site planning or by placing seasonal restrictions on construction activities.

No impacts occur when an action creates no impacts or fewer impacts than the low impact level.

4.8.2 Agency Proposed Action

4.8.2.1 Impacts

Construction — Wintering deer, elk, and moose could be disturbed by construction noise and activity in the Swan Valley and Jackson areas. In addition, some winter range may be affected in the portion of the ROW near the Teton Basin (Oeschsner, 1997). With mitigation, construction during winter would cause a low impact to these animals because the impact could be partially to fully avoided through timing restrictions. (See Section 4.8.2.2, **Recommended Mitigation**.)

Habitat loss from clearing the ROW would impact mostly species that use lodgepole pine and aspen forests. These forest types are plentiful in the area and the amount of clearing required would reduce forest habitat and increase shrub habitat. Because shrub habitat is not as common as the forest habitat that would be removed, the overall result is a minor increase in habitat diversity. Loss of about 73 hectares (181 acres) of mixed conifer trees along the ROW would be a very minor change in relationship to the amount of this habitat available in the immediate project vicinity and throughout the region. Clearing during construction would benefit species using shrubby, open habitats. This would cause a low impact for species associated with forest (e.g., American marten and cavity-nesting birds) and a low beneficial impact for species associated with shrub habitats and forest edge (e.g., northern flicker and American kestrel).

Because the transmission line would either cross streams by spanning drainages, or be located well upslope of stream channels, little if any riparian vegetation would need to be removed during clearing. Removing riparian vegetation during construction could affect wildlife. Riparian habitat provides water and dense cover, and food sources that attract wildlife.

Nesting habitat would be lost for veery, rose-breasted grosbeak, and olive-sided flycatcher, which are neotropical migrant species for which populations have declined somewhat (less than 3 percent) in North America. However, habitats that would be lost are common in the project vicinity and impacts would be confined to the site of action, so the level of impact would be low.

Pine Creek Routing Option A and B — A new corridor above and separate from the existing one (Option A) would create an impact greater than if the existing corridor was expanded (Option B). In addition, this higher area contains more cliff habitat that may contain hawk nests or other bird nests. The potential impacts on these species are greater than Option B.

Pine Creek Routing Option C — This option would cause greater spacing between where the existing and new lines cross the highway. This could increase the potential for avian collisions. This option would result in a minor increase in the amount of forest habitat lost. However, the overall impact from habitat loss would the same as described previously. This option could also increase human access in the area near Pine Creek, resulting in a minor increase in human disturbance to wildlife habitat.

Underground Line Termination Option at Teton Substation- There is no significant change in impacts to wildlife from those described in this impact section.

Access Roads — Several access roads would be improved or added. Added roads would indirectly increase wildlife disturbance because of increased recreational use. Existing roads are used

extensively by a wide range of recreationists and Teton Pass receives particularly high recreational use.

The most notable effect would be for new access created within the big-game winter range areas of Swan Valley and Jackson. The WDGF recommended that new access roads be minimized in these areas. Winter recreational use is not a major issue on the higher elevations because most animals migrate to lower elevations or hibernate during winter. However, the WDGF has recommended seasonal restrictions on construction between the Idaho border and Mail Cabin Creek (from existing structure 22/8 to about structure 27/2) to protect big-game winter range.

Reminder

Map 2 shows structure numbers and locations.

Increased recreation access during spring, summer, and fall would introduce human disturbance into areas that previously contained secure wildlife habitat. Species vulnerable to human presence, such as deer, elk, and nesting raptors, may avoid new roads that attract recreational use. Gating of new roads can partially mitigate this impact, though foot traffic may still occur.

Operation and Maintenance — Some types of birds, particularly water birds such as ducks and geese, are susceptible to collisions with power lines. Collisions typically occur in very specific locations where conditions combine to create a high potential for birds striking lines (Avian Power Line Interaction Committee, 1994). Four factors contribute to this potential: the current level of risk, the type of power lines, the amount of use, and the inherent tendency of species to collide with overhead wires. (See Appendix D, **Wildlife Report,** for a detailed discussion of collision risk.)

The existing transmission line creates a level of risk. Areas of highest concern are where lines cross bird flight paths in Swan Valley (between Swan Valley Substation and structure 4/3), along the second crossing of Pine Creek (between structures 6/12 and 7/1), Teton Pass (between structures 28/1 and 28/5), and the Jackson area (between structure 35/2 and Teton Substation). Trumpeter swans and other species of waterfowl, including sandhill cranes, may fly up Pine Creek drainage on their way between Teton Valley and Swan Valley, though no mortality has been reported where the existing transmission line crosses Pine Creek.

Other migratory birds, including neotropical songbirds, are potentially at risk but are not prone to collision because of their small size and ability to maneuver (Avian Power Line Interaction Committee, 1994). While actively migrating, most birds fly at very high altitudes (Alerstam, 1990) well above the altitude of transmission lines. However, during inclement weather, such as extreme low pressure or at storm fronts, these birds may fly low enough to be at risk.

Because a new line would be placed within an area already containing the same potential risk, the impact would be less than if a new line were placed where there is no existing line. Risks and associated mortality would increase, but risks would not double because there is already risk with the existing line. Avian collision hazards can be reduced by installing line markers. (See Section 4.8.2.2, **Recommended Mitigation**.) Markers have been shown to reduce collisions by 57 to 89 percent (Avian Power Line Interaction Committee, 1994). Because sandhill cranes, great blue herons, and other waterfowl are high-profile species in some of the areas of concern, this risk would be considered a moderate-level impact.

Double-circuit structures placed at Teton Pass, on Phillips Ridge, and in the valley into Teton Substation would be taller than existing structures. Risks and associated mortality may increase because of the greater height. Avian collision hazards can be reduced by installing line markers (see Section 4.8.2.2, **Recommended Mitigation**).

Reminder

A ground wire is typically a single wire spanning the top of the transmission structure that is used to protect the lines from lightning strikes. Ground wires are usually much smaller in diameter than transmission wires.

Many reports list ground wires as a contributing factor to avian collisions. The transmission line may require ground wires because it is in an area with a high potential for lightning strikes. Therefore, the line could contribute more to avian mortality than if ground wires are not required.

Generally, collision with transmission lines is not a major source of mortality for raptors (Olendorff and Lehman, 1986). Impacts to raptors are expected to be low. Other migratory birds, including neotropical songbirds, are potentially at risk but are not prone to collision because of their small size and ability to maneuver (Avian Power Line Interaction Committee, 1994). However, during inclement weather, such as extreme low pressure or at storm fronts, these birds may fly low enough to be at risk.

Bird electrocution occurs where two energized lines are close enough for a bird to touch both at the same time. Larger perching birds, such as golden eagles, red-tailed hawks, and other perching raptors, are the types of birds most at risk. To prevent the problem, BPA provides adequate separation of poles, crossarms, and wires; insulates wires and other hardware where sufficient separation cannot be attained; and places perching platforms away from energized hardware (see Olendorff, et al., 1981). No or few avian electrocutions are expected.

Threatened, Endangered, Candidate, and Forest Service Sensitive Species — Disturbance from construction noise and activity and loss of habitat would have no significant effect on threatened, endangered, or candidate species listed under the Endangered Species Act except for possibly the bald eagle (a threatened species).

Wintering bald eagles occasionally occur along Pine Creek, occur in good numbers in the Jackson area, and occasionally forage along Trail Creek and scavenge on big game winter ranges (Oechsner, 1997). Wintering bald eagles would avoid active construction areas, and their primary foraging areas along the Snake River would be unaffected. Wintering bald eagles are likely to be relatively tolerant of human disturbance because they occur near human population centers. Bald eagle nests are far (2 km [1.2 miles]) from construction. Construction would have a moderate level of impact on individual wintering bald eagles if construction were to occur at that time (which is highly unlikely). Construction timing restrictions, similar to restrictions to protect big-game winter range, would substantially reduce the impact. Collision risk would incrementally increase to bald eagles. However, transmission lines are relatively common in the Swan Valley and Jackson areas, yet no bald eagle mortality from transmission lines has been reported. Human development is the primary factor affecting bald eagle populations, and mortality associated with power lines has a low to no effect on the local populations.

Impacts to other species are given in Table 4-2.

Peregrine falcon nests are far from construction, closer to the Snake River and beyond. A low level of collision risk is expected for peregrine falcons because most of their activity is likely to occur along the Snake River, which is outside the project area. The project area receives very low use by both grizzly bear and gray wolf (both threatened), and no denning is expected near the project. Mountain plovers have never been reported in the area. Because most of the transmission line would either cross streams by spanning drainages, or be located well upslope of stream channels, few if any streams or wetlands that the western boreal toads may use would be disturbed directly during clearing. No to low impacts would occur to these species. Higher impacts could occur from construction of new access roads and placement of permanent or temporary bridges.

Some USFS sensitive species could be affected by construction. The boreal owl, flammulated owl, great gray owl, northern goshawk, and three-toed woodpeckers and other cavity-nesting species, nest in the vicinity. Construction noise and activity would disturb local nesting three-toed woodpeckers and other cavity-nesting species. Low impacts are expected.

Although there are no known nests of boreal owl, flammulated owl, great gray owl, or northern goshawk near the ROW, complete surveys have not been done and other nest sites may be present. Vegetation clearing would reduce potential habitat for these and other raptor species including Cooper's hawks, sharp-shinned hawks, Swainson's hawks, red-tailed hawks, northern harriers, and great horned owls. These species are particularly common in the Swan Valley (between Swan Valley Substation and structure 4/3)

Table 4-2. Impacts to Threatened and Endangered, Forest Sensitive, and Candidate Species

Species	Listing	Impact
Bald Eagle	Threatened	Moderate
Peregrine Falcon	Endangered	Low
Whooping Crane	Endangered	No
Grizzly Bear	Threatened	Low
Gray Wolf	Threatened	Low
Mountain Plovers	Category 1	No
Western boreal toads	Category 1	Low
Spotted Bat	USFS Sensitive	No to Low
Townsend Big-eared Bat	USFS Sensitive	Low
North American Lynx	USFS Sensitive	No to Low
Wolverine	USFS Sensitive	Low
Boreal Owl	USFS Sensitive	Low
Flammulated Owl	USFS Sensitive	Low
Common Loon	USFS Sensitive	No
Harlequin Duck	USFS Sensitive	No to Low
Three-toed Woodpeckers and Other Cavity-nesting Species	USFS Sensitive	Low
Great Gray Owl	USFS Sensitive	Low
Northern Goshawk	USFS Sensitive	Low
Spotted Frog	USFS Sensitive	No to Low
Fisher	USFS Sensitive	Low
Finespotted Cutthroat Trout	USFS Sensitive	Low
Trumpeter Swan	USFS Sensitive	Low

and Jackson area (between structure 35/2 and Teton Substation). Construction would temporarily disturb foraging areas. The largest potential impact for raptors is disturbing active nest sites.

Noise from heavy equipment and workers can cause raptor species to abandon their nest sites, particularly during the early stages of nest tending, when raptors are more likely to leave a nest (Newton, 1979). Raptors that remain at nests near active construction sites may have fewer young survive because adults spend energy defending their nest, rather than obtaining food for themselves and their young. In some situations, raptors may accept the activity as nonthreatening after a few days and remain

unaffected. As a general rule, nests within 0.4 km (0.25 mile) are most vulnerable to abandoning or reduced survival. If nests are located and protected, impacts would be low.

Spotted bat and Townsend's big-eared bat are potentially present but no Townsend's big-eared bat roosting or breeding habitat is present (Christy, R. and S. West, 1993). Between existing structures 6/2 and 6/7, the Pine Creek drainage contains potential habitat for spotted and other bat species. Construction could temporarily disturb this area. Impacts would be low.

North American lynx and wolverine are extremely uncommon in the project area. Though they may be present near the project area, both species are mobile and have large home ranges, so they could shift their use patterns with little or no effect on their survival.

Harlequin duck nesting habitat is potentially present along Pine Creek, which would be spanned causing little or no disturbance to this potential habitat. Common loons are not found in the area.

Spotted frogs could be present within wetlands and streams but with standard construction practices no to low impacts are expected.

Trumpeter swan nest sites are outside the project area and would not be disturbed. Wintering trumpeter swans may use the Swan Valley and Jackson areas. Construction would temporarily disturb a small portion of wintering swan habitat. Low impacts are expected.

More detail on the impacts to these species is provided in Appendix D.

4.8.2.2 Recommended Mitigation

To minimize raptor nest disturbance and comply with the Migratory Bird Treaty Act:

- Time project activity to avoid critical nesting periods (nest trees may be removed once young have fledged and/or a permit has been issued from the USFWS).
- Coordinate with the USFS, USFWS, and the state wildlife agency (IDFG or WDGF) on mitigation strategies. Measures may include nest site monitoring, shortened work days, or minimizing disturbance during the most critical early nesting period.
- Prior to initiating ground disturbing activities, conduct wildlife surveys, as determined through coordination with the USFS.

- If required, survey in spring (from March to June) to identify nest site locations for Cooper's and sharp-shinned hawks, Swainson's hawks, red-tailed hawks, northern harriers, goshawk, and owls.

To minimize disturbance of big-game winter range and disturbance related to new or expanded roads:

- Avoid construction at lower elevations (Swan Valley, Teton Basin, and the Jackson area) during extreme winter weather or unusually heavy snow accumulations, when big-game species are less mobile and more vulnerable to disturbance. Coordinate with the state wildlife agency to ensure that construction does not significantly interfere with big-game wintering.
- Construct from the Idaho state line to Mail Cabin Creek (from structure 22/8 to about structure 27/2) prior to November 15 or after April 30 to protect big-game winter range (Baughman, 1996).
- Gate new roads and consider posting some or all of the new roads for no trespassing.

To reduce avian collisions:

- Consult an expert on avian power line collisions to identify appropriate line markers, such as aerial marking spheres, spiral vibration dampers, or bird flight diverters. Areas where markers should be considered include the Swan Valley area (between Swan Valley Substation and structure 4/3), the second crossing of Pine Creek (location depends on which Pine Creek Routing Option is chosen), Teton Pass (between structures 28/1 and 28/5), and the Jackson area (between structure 35/2 and Teton Substation).
- Where possible, line up new structures with existing structures to minimize the vertical separation between the two sets of lines.
- After construction, periodically monitor potential problem areas to identify unmitigated problem areas and increase or modify markers as appropriate.

4.8.2.3 Cumulative Impacts

The project would add to the existing human influences that have altered the landscape. Development of additional roads in the project area, considered collectively with the existing impact, would result in a linear connection across the project alignment. While mitigation may include access restriction, use of the alignment by people would increase. During construction,

disturbance of wintering bald eagles, big game, and other species in the Swan Valley, Teton Basin, and Jackson areas would add to the increasing level of disturbance in these areas resulting from residential development and associated human presence.

4.8.3 Single-Circuit Line Alternative

4.8.3.1 Impacts

Impacts would be the same as the Agency Proposed Action except for the possible increased risk of collision from the double-circuit structures in the Agency Proposed Action.

4.8.3.2 Recommended Mitigation

- Refer to measures under Agency Proposed Action, Section 4.8.2.2.

4.8.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.8.2.3).

4.8.4 Short Line Alternative

4.8.4.1 Impacts

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation. There would be no additional impacts from the switching station.

4.8.4.2 Recommended Mitigation

Mitigation would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.8.4.3 Cumulative Impacts

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.8.5 SVC Alternative

4.8.5.1 Impacts

Construction at Teton Substation or Jackson Substation would have no significant effect on wildlife. Operation and maintenance of the SVC would have no significant impact on wildlife because minimal noise or activity would be generated. Jackson Substation is in an urban environment and though bald eagles may use nearby Flat Creek, there would be no major added disturbance to eagles.

4.8.5.2 Recommended Mitigation

- Survey the area within 0.8 km (0.5 mile) of Teton Substation for nesting hawks. If nests are found, construction activities should be coordinated with the WDGF to minimize disturbance.

4.8.5.3 Cumulative Impacts

No cumulative impacts would occur.

4.8.6 No Action Alternative

No project-specific or cumulative impacts to wildlife would occur, but impacts would continue from operation and maintenance of the existing transmission line and substations.

For Your Information

Construction and operation of a transmission line can cause impacts to fisheries. If topsoil and vegetation are removed, soil erosion occurs and water quality in nearby streams is degraded. Construction activities near streams could be scheduled to avoid sensitive fish spawning, incubation, and migration periods (April to mid-June). Though construction activities may occur in spring, BPA would try to use existing, reconstructed, or temporary bridges to cross sensitive streams. Culverts would typically be installed on smaller or intermittent streams and would pose no significant threat to sensitive fish resources.

4.9 Fisheries

4.9.1 Impact Levels

An impact would be **high** if an action causes:

- the killing of a federally-listed or proposed threatened or endangered fish species; or
- a significant long-term adverse effect on the populations, habitat, and/or viability of USFS sensitive fish species and state fish species of concern as a whole, which would result in trends toward endangerment and the need for federal listing.

An impact would be **moderate** if an action causes:

- a localized and/or short-term (to three years) reduction in the quantity or quality of an aquatic resource or habitats which does not result in the killing of a federally-listed species, or significantly affect a USFS sensitive species or state species of concern.

An impact would be **low** if an action causes:

- a temporary (less than 3 years) reduction in the quantity or quality of aquatic resources or habitats confined to the site of the action.

No impacts would occur when an action creates no impacts or fewer impacts than the low impact level.

4.9.2 Agency Proposed Action

Reminder

Map 2 shows structure numbers and locations.

4.9.2.1 Impacts

Construction and Operation — In two areas, at Pine Creek (structures 7/5 to 7/8, 8/2 to 8/8, and 9/5 to 10/5), and at Trail Creek (Teton River tributary, structures 26/8 to 27/6) the ROW parallels these streams on a steep slope. BPA would try to avoid structure construction in unstable areas, or areas which could cause long-term sediment loading to streams.

Pine Creek Routing Options A-C — These options would have no to low impacts on fisheries.

A spring runs over USFS Road #252 and BPA may need to divert water from the spring to access structure 11/6 during construction. This may cause moderate levels of turbidity. If BPA uses standard stabilization and erosion control practices (see Section 4.5.2.2, **Recommended Mitigation**), low impacts are expected.

The land next to Teton Substation (structures 35/6 to 36/4) is saturated with water during some seasons. Construction access to structure sites near Teton Substation would be improved to minimize impacts. Culverts may be installed temporarily in small streams and the culvert in Lake Creek may be extended and reinforced.

Underground Line Termination Option at Teton Substation - Digging a trench for the underground cable may come in contact with groundwater. If this happens, water would not be discharged directly into live streams. There would be no impacts on fish.

BPA would likely install some culverts and bridges to cross streams during construction. Blocking or impeding fish passage could decrease the spawning or rearing habitat of migrating

species. Culverts used where fish are present would be designed to achieve appropriate flow and depth for fish passage, and be large enough to prevent clogging with debris. Where practical, the culvert would be set to grade and provide direct entrance and exit for water flow. Where necessary, BPA would armor the culvert entrance and exit to prevent erosion and physical barriers. If streams with sensitive fisheries are crossed, BPA may install temporary bridges during construction rather than installing a culvert. Low impacts are expected.

For Your Information

Manual methods of vegetation management include removing vegetation by chain saws and hand tools. Biological methods include encouraging low-growing species to dominate by eliminating the taller trees and introducing species-specific parasites.

Maintenance — After construction, BPA would manage vegetation on the ROW (see Section 2.1, **Agency Proposed Action**). Besides manual, mechanical, and biological methods of vegetation removal, the approach may include the use of herbicides that could affect fish directly through toxicity, or indirectly by altering stream-vegetation interactions (for example, altered leaf and litter fall, insect populations, and shading).

A new ROW Management Plan would be developed within a year of project completion that addresses how BPA would maintain the line, including methods used to manage vegetation. At that time BPA would work with the Forest Service to identify the manual, mechanical, biological, and chemical methods needed to manage vegetation. Additional site-specific environmental work would be completed at that time.

4.9.2.2 Recommended Mitigation

Because BPA would use standard stabilization and erosion control measures (see 4.5.2.2, **Recommended Mitigation**), no other mitigation is required.

4.9.2.3 Cumulative Impacts

Construction would not contribute significantly to existing amounts of sediment in streams. Clearing streamside vegetation increases a stream's exposure to sunlight, possibly raising water temperature, which could affect fisheries.

4.9.3 Single-Circuit Line Alternative

4.9.3.1 Impacts

Impacts to fisheries would be the same as the Agency Proposed Action.

4.9.3.2 Recommended Mitigation

- Refer to measures under Agency Proposed Action, Section 4.9.2.2.

4.9.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.9.2.3).

4.9.4 Short Line Alternative

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.9.4.1 Recommended Mitigation

Mitigation measures would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.9.4.2 Cumulative Impacts

Cumulative impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.9.5 SVC Alternative

4.9.5.1 Impacts

Although there are streams and drainages around Teton Substation, new equipment would not require expansion into undisturbed areas. No impacts to fisheries would occur.

Jackson Substation is isolated from nearby Flat Creek. The site is fairly level and there is little risk of sediment reaching the creek. No impacts to fisheries would occur.

4.9.5.2 Recommended Mitigation

No mitigation measures would be required.

4.9.5.3 Cumulative Impacts

No cumulative impacts to fisheries would occur.

4.9.6 No Action Alternative

No project-specific or cumulative impacts to fisheries would occur, but there would still be continued impacts from operation and maintenance of the existing transmission line and substations.

4.10 Cultural Resources

4.10.1 Agency Proposed Action, Single-Circuit Line Alternative, Short Line Alternative and SVC Alternative

4.10.1.1 Impacts

All of the proposed line alternatives would closely parallel the existing ROW which has already caused ground disturbance. The SVC Alternative would also be built on previously disturbed land. There have been few prehistoric or historic archaeological sites recorded in or near the existing ROW or substations. This is, in part, a reflection of the limited archaeological inventories of the area. Although the potential to find sites is low (see below), BPA would conduct a cultural resource survey of the ROW during summer 1997.

Prehistoric Site Potential — The potential to find prehistoric sites along the new ROW is low. Though there is native flora and fauna that would have been used by prehistoric peoples, they did not occur in sufficient quantities or varieties to attract large numbers of people to the area. Nevertheless, there were adequate game and plant resources to attract small groups or bands of people. Ethnographic evidence clearly shows that many parts of the area were occupied by Shoshone Indians in the 1700s and 1800s. Small campsites and specialized procurement sites for obsidian and plant resources such as camas may be found. Most habitation sites may also occur near water. Using only the known data base and the information cited above, it is difficult to predict where prehistoric sites may be within the project area.

Historic Site Potential — The potential to find historic sites along the new ROW is low. The climate is restrictive and much of the area is on national forestlands. Construction and other ground-disturbing activities have been severely limited on these lands since the turn-of-the-century. Sheep and cattle grazing on public lands leaves few lasting effects on the landscape.

Transportation-oriented sites are obvious in the project area. The existing ROW frequently parallels highways and other roads that have been travel corridors since the beginning of historic occupation in the region. Forest Service activities are evident including recreation, wildlife management, and limited timber harvesting. The nature and extent of documented historic use suggests that relatively few additional historic sites would be identified in the area. Sites found during an inventory would probably consist of temporary occupation sites, sites related to agricultural activities, Forest Service-related sites, or sites related to road and highway construction.

For Your Information

In addition to positive and negative impacts, short-term socioeconomic impacts include those created by an influx of construction workers into a local area and the additional tax monies generated. Long-term impacts include the value of any agricultural crops taken out of production, interference with agricultural practices, the value of forestlands taken out of production, and the perceived effects on property values from new transmission and substation facilities.

4.11 Socioeconomics

4.11.1 Impact Levels

- A **positive** impact would provide employment, increase tax revenues, increase property values or create other similar effects on the social and economic vitality of affected communities.
- A **negative** impact would take land out of production without compensation, reduce a tax base, reduce employment or create other similar effects on the social and economic vitality of affected communities.

4.11.2 Agency Proposed Action, Single-Circuit Line Alternative, Short Line Alternative and SVC Alternative

4.11.2.1 Population

Implementation of these alternatives would not be growth inducing, that is, would not encourage population growth in the area, but rather would be a response to the growth that is already occurring in northwestern Wyoming. The local population has not and would not increase because of the availability of electric power, however, without the alternatives, population growth would likely slow, and could lead to a population decline (see also Section 4.11.3, **No Action Alternative**).

None of the construction alternatives would have a detrimental effect on minorities or economically disadvantaged groups in the area because these groups do not reside in large numbers (fewer than 5 percent) in the project area.

4.11.2.2 Employment

Because transmission line construction requires specialized labor, construction crews would likely be brought in from outside the local area. Many workers would come from such places as Spokane, Billings, and/or Salt Lake City, and return home in the off season, and following project completion.

Construction would likely occur over two years. About 18-24 persons would be needed to construct a project of this scale. This would be a positive impact on employment in general but not necessarily in the area if workers do not come from the project area.

4.11.2.3 Housing/Public Services

Socioeconomic impacts on public services and temporary housing facilities are relatively minor for transmission line construction projects in most areas. Because low-cost temporary housing is in short supply in the area, especially during spring and summer, most construction workers would likely provide their own housing (e.g., campers and trailers) rather than seek commercial lodging. Because of limitations imposed on camping within national forests (usually a 14-day maximum) construction crews would likely use RV parks. RV parks are available in the Swan Valley, Driggs, and Victor areas of Idaho and also in the Jackson and Wilson areas of Wyoming. These parks could accommodate construction personnel. Facilities are available by the day, week, month or season. Because of the large number of RV parks in the area and the relatively small size of the construction crews who would build the project, there should not be any negative impacts to the temporary housing supply in the area.

4.11.2.4 Sales Tax/Use Tax

The major cost of any transmission line project is labor and materials. No sales or use tax would be levied in Wyoming on materials purchased by BPA for the proposed project, but Idaho would assess a 5 percent sales/use tax on those materials. No additional amount would be assessed by counties within the state. Therefore, the Agency Proposed Action would generate about $200,000 for the state of Idaho.

Idaho and Wyoming sales taxes would also be assessed on incidental purchases by the contractor, crews, and subcontractors. Because crews would be in the area only temporarily, and would not likely stay in commercial lodging facilities, incidental purchases would be limited to provisions such as food (tax

exempt), fuels (non-tax exempt) and other minor purchases such as tools and clothing. These purchases would be in small amounts and any sales tax collected would be a positive but minor impact.

4.11.2.5 Income Tax

Construction of the alternatives would generate additional income taxes for the state of Idaho, a positive impact. No additional funds would be generated for the state of Wyoming, since Wyoming does not assess a state income tax.

4.11.2.6 Property Tax

BPA, as a federal agency, is exempt from paying local property taxes, so the alternatives may not benefit local governments.

The expansion of Jackson Substation in the Town of Jackson to accommodate an SVC station would require additional land be acquired next to the substation. Depending on whether BPA or LVPL would acquire the land, and which entity would own the station, property taxes could be assessed on the new facility by the Wyoming Department of Revenue. Because public utilities cross county lines, they are not a locally assessed item (Sutton, 1997).

If it is determined that property taxes would be levied on the land and new facility at Jackson Substation, and assuming the market value of the improvement (including the land) would be between $3-5 million, property taxes would range from $22-36,000 per year, based on the current 11.5 percent level of assessment placed on industrial properties within the state, and the current millage rate of 64.04 for the Town of Jackson (Uhrich, 1997). This would be a small positive impact for the state of Wyoming and the property owners within those taxing districts who would benefit from the increased tax base.

If BPA owns the land and improvements and they would be exempt from property taxes, the land acquired would be removed from the tax rolls for the life of the facility, about 50 years. This would be a small negative impact for the state of Wyoming, Teton County and the Town of Jackson.

4.11.2.7 Property Value

Any new transmission line or access road easement would be appraised, and the landowners would be offered the fair market value for these land rights. Some short-term adverse impacts on property value and salability along the proposed new ROW may occur on individual properties. However, these impacts are highly

variable, individualized, and not predictable. The new line is not expected to cause overall long-term adverse effects on property values along the existing ROW. (See Appendix G, **Property Impacts**, for more information on impacts to property.)

4.11.2.8 Land Taken Out of Production

About 400-1200 m^2 (0.1 to 0.3 acre) of land in wheat and barley would be removed from production for the life of the line.

The Agency Proposed Action, the Single-Circuit Line Alternative, and the Short Line Alternative would remove both marketable and non-marketable forest products from the Targhee and Bridger-Teton National Forests. These two forests would likely conduct a timber sale within the new ROW. Assuming a 23 m (75-foot) ROW would be acquired across about 18 km (30 miles) within these two national forests, except for small areas of double-circuit structures, about 73 hectares (181 acres) of trees would be harvested and sold. It would be about half that amount for the Short Line Alternative. Because of the size of the two national forests and the limited amount of timberland that would be removed from production, it would be a beneficial impact to the three counties affected, that is, Bonneville and Teton counties, Idaho, and Teton County, Wyoming. About 25 percent of the stumpage value of the trees harvested would be distributed and used for county roads improvements and schools within these counties. This would be a short-term, positive impact.

4.11.2.9 Recommended Mitigation

- BPA would compensate private landowners for the fair market value of any land taken out of production.
- BPA would work with the landowners/land managers to site the proposed line and individual structure locations to minimize the impact.

4.11.3 No Action Alternative

4.11.3.1 Impacts

The No Action Alternative could lead to voltage collapse if a critical line is lost on the system. Collapse of the system could continue over a long period (a week or more) if outages occur in winter when deep snows make access to the existing transmission system difficult. The chance that service would be disrupted increases with time as load grows. Commerce and industry would

be adversely affected as the quality and reliability of power decreased. Population growth would slow and likely lead to a rate that would not maintain itself over the long term.

When a loss of electricity occurs, all services provided by electrical energy cease. Illumination is lost. Lighting used by residential, commercial, industrial and municipal customers for safe locomotion and security is affected. Residential consumers lose heat. Highways experience gridlock where traffic signals fail to operate. Industrial production is halted. Residential, commercial, and industrial customers experience comfort/safety and temperature impacts, increases in smoke and pollen, and changes in humidity, due to loss of ventilation. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential customers. Commercial and industrial customers also lose service for elevators, food preparation, cleaning, office equipment, heavy equipment, and fuel pumps. Transportation impacts include propulsion loss. Sewage transportation and treatment can be disrupted.

Electricity for cooking and refrigeration is lost. Residential, commercial, and industrial customers cannot prepare or preserve food and perishables. A special problem is the loss of industrial continuous process heat. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments.

The No Action Alternative has negative socioeconomic impacts.

4.12 Air Quality

4.12.1 Impact Levels

A **moderate** impact would create one or more of these outcomes:

- Create an effect that could be mitigated partially.
- Cause a localized reduction in air quality.
- Create a possible, but unlikely risk to human health or safety.

A **low** impact would create one or more of these results:

- Create an effect that could be largely mitigated.
- Reduce the air quality near the construction/clearing.
- Create insignificant or very unlikely health and safety risks.

A **low or no** impact would create no, or fewer impacts than the low impact level.

4.12.2 Agency Proposed Action, Single-Circuit Line Alternative, and Short Line Alternative

4.12.2.1 Impacts

Short-term impacts during construction would be created by vehicles and ***slash*** burning.

Vehicles and heavy equipment would emit pollutants such as ***carbon monoxide*** (***CO***), ***sulfur oxides***, particulate matter, ***nitrogen oxides***, ***volatile and semi-volatile organic compounds***, and ***carbon dioxide*** (***CO_2***). Emissions would be short term and would have no to low impacts on air quality.

Dust generated during line construction and clearing activities would have a short-term effect on air quality. Dust would have no to low impact on air quality.

Burning slash would emit particulate matter, CO, CO_2 and semivolatile and volatile organic compounds. Predicting the precise quantity of air emissions from these fires is impossible since variables such as the quantity of debris to be burned and wood moisture content are unavailable. However, if the Agency Proposed Action were chosen and 60 percent of the tree mass was slash and thus burned, between 27-45 ***metric tons*** (30-50 tons) of particulate matter would be emitted. The amount depends on the acreage to be cleared and the tree density. This is a relatively large amount of particulate matter, and would temporarily affect visibility in several Class I Areas, and create a moderate impact on local air quality.

The only potential for long-term impacts to air quality would be from the transmission lines themselves, which cause limited air emissions. The high electric field strength of an 115-kV transmission line can cause a breakdown of air at the surface of the conductors called corona. Corona has a popping sound that is most easily heard during rain storms. When corona occurs, small amounts of ozone and oxides of nitrogen are released. These substances are released in very small quantities too small to measure. No impacts are expected.

4.12.2.2 Recommended Mitigation

- If necessary, water trucks would be used to spray roadways and construction areas to minimize dust.
- All on-road vehicles would be in good running condition, thus minimizing their emissions.
- On-road vehicles would use low sulfur fuel.

- BPA would try to avoid burning slash because of its potential detrimental effects on local air quality and visibility in nearby Class I areas.
- Burning permits and ignition approval would be obtained from Wyoming and Idaho and all permit requirements would be met.
- Burning on national forests would be coordinated with the USFS.
- Burn as little material as possible.
- Burning would not occur during inversions.
- Initiate burning in late October or early November, after the first snows. Burning during this period would: allow the slash to dry, decreasing emissions; provide fire protection (because of the snow); and adequately disperse smoke from the fires, reducing impacts to the Jackson Valley and to the surrounding Class I areas.
- Lop and scattered residues on the ROW to degrade.

4.12.2.3 Cumulative Impacts

There would be no cumulative effects on local or global air quality.

4.12.3 SVC Alternative

No impacts are expected.

4.12.4 No Action Alternative

No impacts are expected from the alternatives.

4.13 Short Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The alternatives under consideration do not pose impacts that would significantly alter the long-term productivity of the affected environment. A good example of this is the existing line. It was built in 1968. The affected environment has recovered since then and while there is never complete recovery, the long-term productivity of the affected environment has not been significantly altered. Likewise, if the measures proposed in the alternatives were removed and the affected areas restored, little change in the long-term environmental productivity would have been caused.

For Your Information

Irreversible commitment of resources *is use of nonrenewable resources such as minerals and petroleum-based fuels.*

Irretrievable commitments of resources *cause the lost production or use of renewable resources such as timber or rangeland.*

4.14 Irreversible and Irretrievable Commitment of Resources

The Agency Proposed Action, Single-Circuit Line Alternative, Short Line Alternative, and the SVC Alternative would include the use of aluminum, steel, wood, gravel, sand, and other nonrenewable material to construct steel structures, wood poles, conductors, insulators, access roads and other facilities. Materials may come either from on-site borrow pits or from outside sources. These alternatives would also require some petroleum-based fuels for vehicles and equipment and steel for structures.

Development of the Agency Proposed Action, Single-Circuit Line Alternative, and the Short Line Alternative would cause commitments that result in the loss of wildlife habitat for certain species and lost production or use of renewable resources such as timber and rangeland. These alternatives would permanently convert wildlife habitat, forested land, and rangeland to utility and transportation uses. Increased volume growth that could have been achieved through silvicultural prescriptions would be foregone, an irretrievable commitment of timber resources. Other irretrievable commitments include small amounts of land lost to grazing, crop production, and in some cases, recreational use if access roads are gated. These commitments are irretrievable rather than irreversible because management direction could change and allow these uses in the future.

4.15 Adverse Effects that Cannot be Avoided

Adverse effects on some resources cannot be avoided by actions proposed under the alternatives. Actions to benefit one resource may have temporary or permanent effects on another. Alternatives include recommended mitigation measures to avoid or reduce adverse environmental effects. Many adverse effects would be temporary, occurring during site-specific activity.

Some of the adverse effects that cannot be avoided in the alternatives include the following:

- Intermittent and localized decreases in air quality from dust from road construction, road maintenance and use.
- Short-term localized increases in soil compaction, soil erosion, vegetation degradation and stream sedimentation from construction and maintenance.
- Elimination of small areas of vegetation, including some wetland vegetation, due to construction of permanent physical developments such as transmission line structures and bridge abutments.

- Temporary disturbances of wildlife and their habitat in localized areas from increased human activity during construction.